

MARINE REVIEW.

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No. 3.

Col. James Pickands.

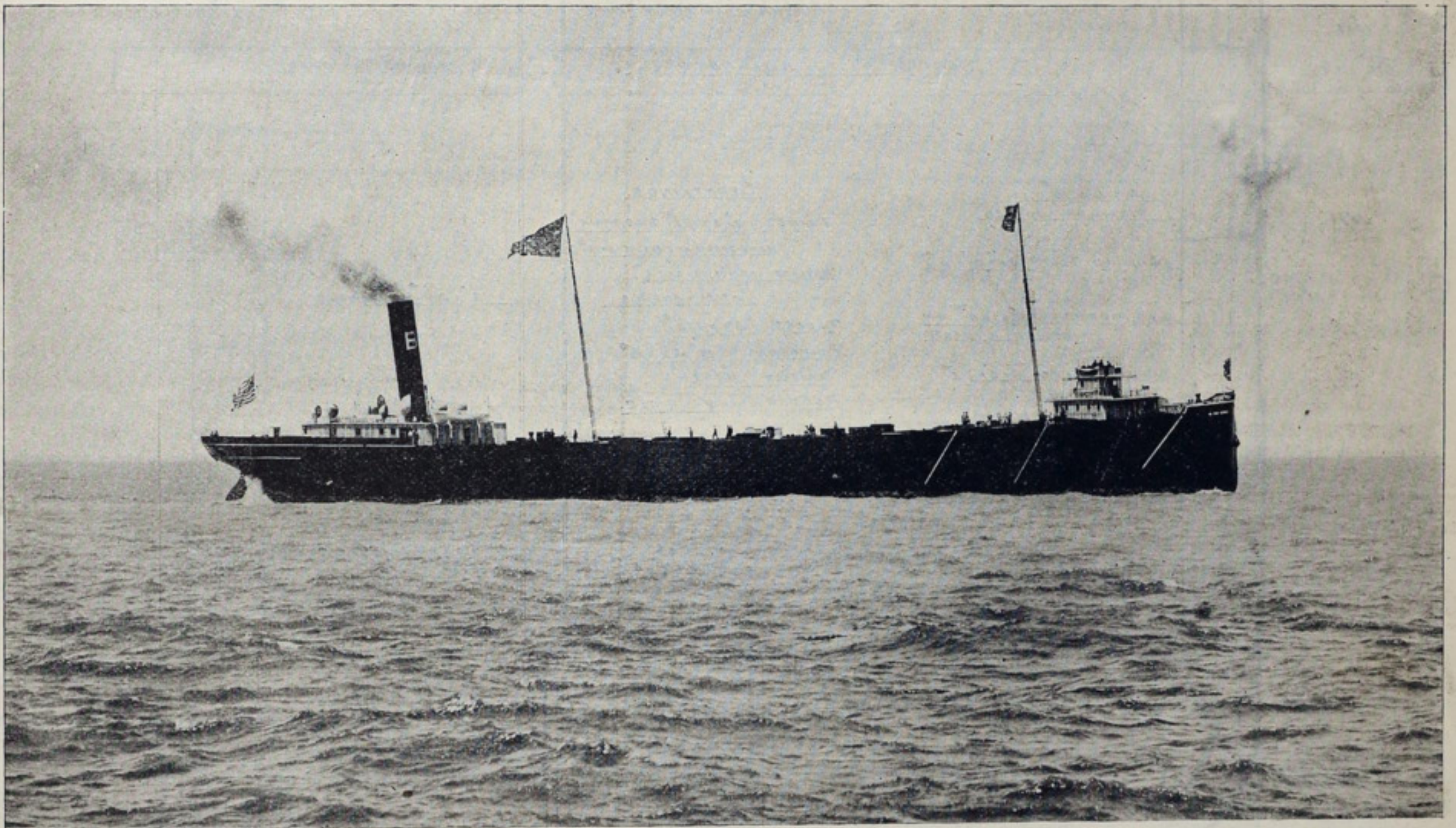
Few men associated with lake shipping or the mining business of Lake Superior have been as generally respected as Col. James Pickands, senior member of the firm of Pickands, Mather & Co. of Cleveland, who died suddenly at his home on Tuesday. It is difficult to think of anybody connected with these industries over whom there would be more universal regret. In business he had, within the past fifteen years especially, been successful to a wonderful degree, but he retained the plain, unassuming manner that was characteristic of him in earlier days.

Col. James Pickands was born in 1839, at Akron, O. He entered the late war with the 124th regiment of Ohio volunteers. He returned with the rank of colonel and an excellent record. He had distinguished himself as a soldier but he was seldom heard to speak of his connection with the army, even among his comrades in arms. He was modest in all respects. The REVIEW presents a portrait of Col. Pickands as a supplement to this issue, but a likeness of him had never appeared in print previous to his death. He objected to show or display of any kind.

Shortly after the war Col. Pickands removed to Marquette, Mich., and established a coal, hardware and general mining supply business at

Erie Canal Improvements.

THE REVIEW has had two or three inquiries relative to improvements to be made by the state of New York on the Erie and other canals of that state. It is quite evident that the extent of these improvements is not generally understood on the lakes. At the last state election in New York, \$9,000,000 was voted to be expended on the canals; and the manner of providing the money is such that it will be forthcoming about as rapidly as it can be expended. All of the canals are included, but the Erie canal is to get the big share of the improvements. The Erie is to be deepened to not less than 9 feet, except over and across aqueducts, mitre sills, culverts and other permanent structures, where the depth of water shall be at least 8 feet, but the deepening may be performed by raising the banks wherever the same is practicable. This would mean in reality that the improvements contemplate an increase of full 2 feet and probably 3 feet in draft, as the draft of the Erie canal now is about 6 feet. The law also provides for the lengthening and improving of some of the locks in the canal which now need improvement more than others. It is quite generally understood that under the appropriation of \$9,000,000 the state officials will manage to provide alterations in locks



STEAMER SIR HENRY BESSEMER, FIRST OF THE ROCKEFELLER SHIPS.

that point. The firm of James Pickands & Co. was one of the best known concerns in the Lake Superior region. In 1882 he came to Cleveland and organized, with Mr. Samuel Mather of Cleveland, the firm of Pickands, Mather & Co., dealers in iron ore, pig iron and coal. His interests in Marquette were subsequently disposed of almost entirely. The success of the firm of Pickands, Mather & Co. is known to readers of the REVIEW. They are now handling for one corporation, the Minnesota Iron Co., more than 2,000,000 tons of iron ore annually. All branches of the firm's business is in strong hands. Its organization is as complete as that of the biggest and most prosperous corporations in the country.

A steam shovel used in open pit mining at the Oliver iron ore mine, Mesabi range, Minnesota, is capable of loading, with proper car service, about 5,000 gross tons in ten hours. Another shovel at the Mountain Iron mine, in the same district, has loaded into cars from the natural ore bed 4,275 tons in ten hours. The shovel at the Oliver mine is of steel, 190 horse power, and carries a dipper holding five tons.

that will eventually admit of boats 10 feet longer than those now using the canals, and that the dead-weight capacity of vessels of maximum size in the enlarged canal will be about 450 tons. The limit of size in Erie canal boats now is 98 feet length and 7 feet 11 inches width. It is thought that the improvements will be completed in about three years.

Captains of the Bessemer Steamship Co.'s sixteen vessels have been selected for some time past but the full list has up to this time not been given out. In the seven new steamers will be E. W. Smith, Clint. Ennis, R. E. Byrne, John Lowe, F. W. Stenton, D. B. Craine and Bernard Nelson; in the five new barges, H. Gunderson, W. J. Hunt, S. E. Lewis, John Gillis and A. McArthur. Captains Gillis and McArthur are now in the barges that tow with the steamers Court and Neilson, and the men who are to take their places when the transfer to new boats occurs have been selected but their names are withheld. Captains of the steamers Court and Neilson are James Jackson and Charles E. Moody.

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COLONEL JAMES PICKANDS.

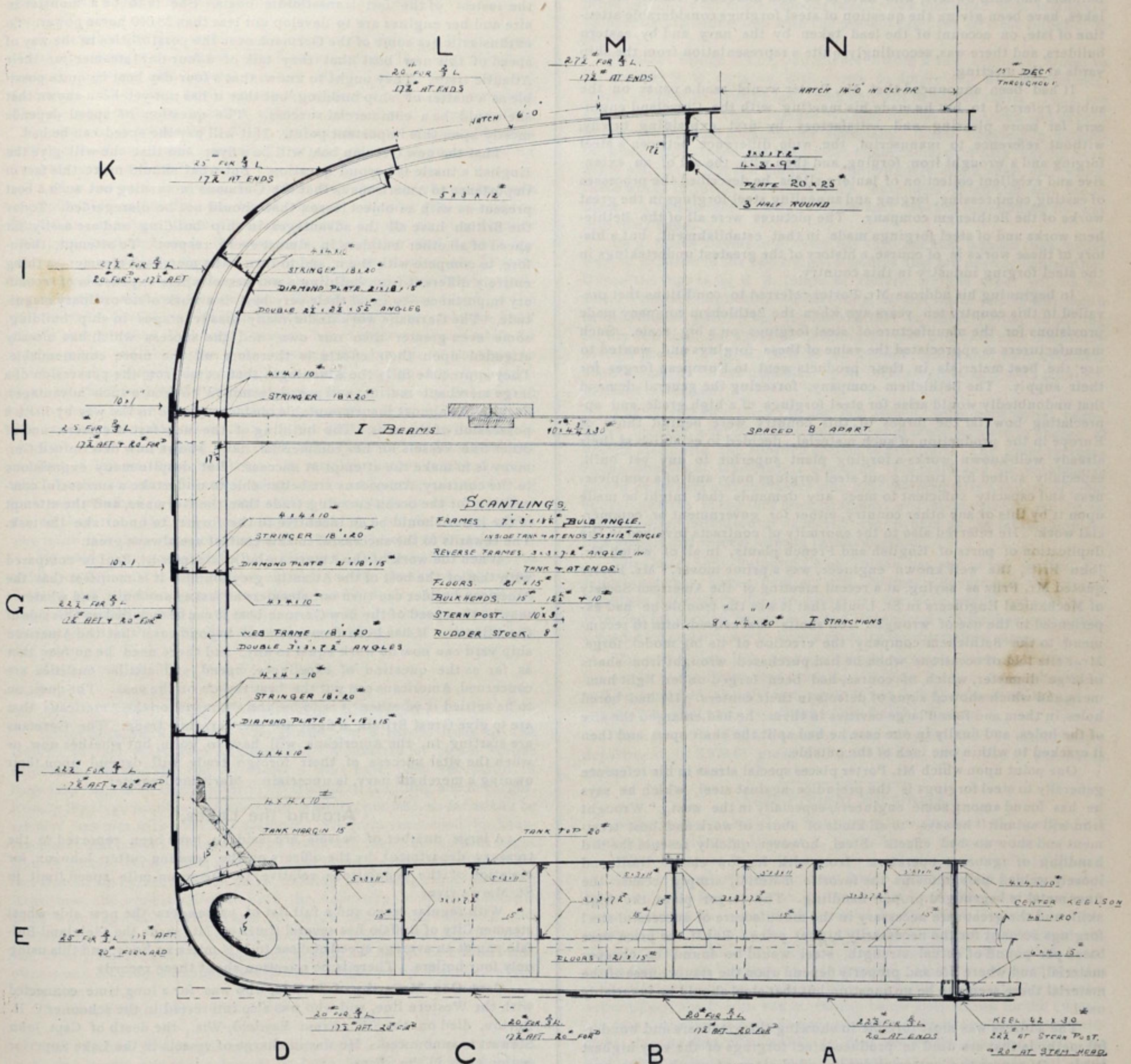
Supplement to the Marine Review, July 16, 1896.

ders 25, 40 and 68 inches diameter by 42 inches stroke. Her three boilers are of the Scotch type, each 13 by 13 feet, and allowed 175 pounds steam pressure. Engines and boilers were built by the Cleveland Ship Building Co. All pumps are connected. A complete electric light installation will extend to holds, cabins, engine room, etc., and there will be four arc lights on deck. Alike to all other steamers of the fleet, the Ericsson will have a steam windlass with four steam capstans. Her steam steerer will be of the Williamson type. She will have two pole masts for signals, lights, etc.

The length of the barge Alexander Holley between perpendiculars is

etc., are between decks, aft. The barge also has a complete electric light installation in holds, cabins, pump room, etc., together with three arc lights on deck. A ballast pump of Hughes make, with large donkey boiler, is fitted up in a large pump room, aft. The steam steering gear is of the Williamson type, and there are three steam capstans and a steam windlass. Pole masts, to be used simply for lights, etc., will be fitted.

Letters bearing the following names await claimants at the marine post office, Detroit, Mich.: Capt. John Bergier, Alfred Bailey, Mrs. Geo. Brainbridge, Geo. D. Bentley, Fred. Birdenaw, Mrs. Geo. P. Bower, Will



CROSS SECTION OF STEEL BARGE ALEXANDER HOLLEY, BUILT BY AMERICAN STEEL BARGE CO., WEST SUPERIOR, WIS.

376 feet; breadth, moulded, 46 feet; depth at center, 26 feet; height between decks, 9 feet; depth of water bottom, 4 feet; capacity of water ballast tanks, 1,700 tons. She is also fitted with between-deck beams but has no laid deck, except at ends. Alike to the steamer, her construction is on the bulb-angle principle. She has twelve center-line cargo hatches, each 14 feet by 7 feet 9 inches, and spaced 24 feet centers. In addition she has eleven side hatches on the port side only, each 6 feet by 3 feet 9 inches, also spaced 24 feet centers. This vessel is fitted with two turrets, the after one containing entrance to quarters for officers, and the forward one entrance to crews' quarters, forecabin, steam windlass, etc. Accommodations for the crew are fitted up in the forecabin, over the fore peak tank, while quarters for the officers, as well as kitchen, dining room,

Bonyer, Mrs. M. Chamberlain, Mrs. Jim Craig, Edward Cottreel, George S. Elsworth, Bertha M. Ebert, Chas. Grant, Gust Gagnon, F. Hodge, Asa L. Knight, Herman Luty, Joseph Lamontague, Wm. Langnese, Archie McMameny, John McIntosh, Jas. McKinly, Hugh Morris, Napoleon Morris, Frank Neffen, Michael Oles, J. R. Perritye, D. Pigeon, Wm. S. Reilley, Martin Richardson, W. H. Stevenson, Arthere Simmons, M. A. Sibley, M. A. Shormahley, Joseph Sampson, Dan Scanlan, C. M. Williams, Mrs. J. J. Winterwalter, Capt. Ed. Willisroft, Ben. J. Ward.

Purchase a ticket to New York City via the Nickel Plate road and save \$1.00, either first or second class. Through trains with dining cars and sleepers.

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How Steel Forgings are Made.

At a regular meeting of the Civil Engineers' Club of Cleveland, Tuesday, Mr. H. F. J. Porter of Chicago, member of the American Society of Mechanical Engineers and western representative of the Bethlehem Iron Co. of South Bethlehem, Pa., talked to the engineers on the subject "How Steel Forges are Made." Within the past year the Globe Iron Works Co. of Cleveland, Dry Dock Engine Works of Detroit and F. W. Wheeler & Co. of West Bay City, all leading ship building concerns of the lakes, have taken up, to some extent, the use of steel forgings. Ship builders and ship owners, who have to do with merchant vessels on the lakes, have been giving the question of steel forgings considerable attention of late, on account of the lead taken by the navy and by eastern builders, and there was, accordingly, quite a representation from the ship yards at the meeting.

It had been announced that Mr. Porter would read a paper on the subject referred to, but he made his meeting with the Cleveland engineers far more pleasing and satisfactory by first explaining briefly, without reference to manuscript, the wide difference between a steel forging and a wrought iron forging, and then with the aid of an extensive and excellent collection of lantern slides he described the processes of casting, compressing, forging and annealing steel forgings in the great works of the Bethlehem company. The pictures were all of the Bethlehem works and of steel forgings made in that establishment, but a history of these works is, of course, a history of the greatest undertakings in the steel forging industry in this country.

In beginning his address Mr. Porter referred to conditions that prevailed in this country ten years ago when the Bethlehem company made provisions for the manufacture of steel forgings on a big scale. Such manufacturers as appreciated the value of these forgings and wanted to use the best materials in their products went to European forges for their supply. The Bethlehem company, foreseeing the general demand that undoubtedly would arise for steel forgings of a high grade, and appreciating how far the forges of this country were behind those of Europe in the production of such material, decided to establish at their already well-known works a forging plant superior to any yet built, especially suited for turning out steel forgings only, and of a completeness and capacity sufficient to meet any demands that might be made upon it by this or any other country, either for government or commercial work. He referred also to the enormity of contracts involved in the duplication of parts of English and French plants, in all of which Mr. John Fritz, the well known engineer, was a prime mover. Mr. Porter quoted Mr. Fritz as saying, at a recent meeting of the American Society of Mechanical Engineers in St. Louis, that it was the trouble he had experienced in the use of wrought iron shafts that caused him to recommend to the Bethlehem company the erection of its big model forge. Mr. Fritz told of occasions when he had purchased wrought iron shafts of large diameter, which, of course, had been forged under light hammers, and which showed signs of defects in their centers. He had bored holes in them and found large cavities in them; he had enlarged the size of the holes, and finally in one case he had split the shaft open and then it cracked to within one inch of the outside.

One point upon which Mr. Porter places special stress in his reference generally to steel forgings is the prejudice against steel, which he says he has found among some engineers, especially in the west. "Wrought iron will submit" he says "to all kinds of abuse of work and heat treatment and show no bad effects. Steel, however, quickly resents the bad handling of ignorant operators. Iron, with its low elastic limit and loosely welded mass, remains the favorite material, simply because the finer metal is begrudged proper handling. The larger plant, the high skill, and the great care necessary in the manufacture of successful steel forgings account for the necessarily higher price. But if the price were based per pound of actual strength, steel would be found the cheaper material, and where life and property depend upon the staunchness of the material there seems to be no question but that steel should be invariably used."

The address was most forcible in showing the great care and wonderful methods that are used to produce steel forgings of the very highest grade. Of course the lantern slides included views of crank shafts, propeller shafts and other forgings of immense proportions for naval vessels, as well as the fast Atlantic liners of the American line—St. Louis, St. Paul, New York and Paris. These were especially interesting to the marine engineers who were present. One of these engineers summing up a line of thought prompted by the address, said: "It will undoubtedly be but a short time before steel will entirely supplant iron for engine forgings, just as it has supplanted it in the building trades where it is more economical to use a lighter and stronger material than has been used previously. It is only within the last few years that steel for hulls has been taken up by the ship builders on the lakes. They took it up after watching the experience of ship builders in England and in the east. It was brought about also by progressive vessel owners. It will be the same with steel forgings. The ship owner will demand

them. It is to his interest to obtain the very best material he can get to insure his vessel against accidents; to lighten in a small degree the weight which his vessel is to carry. Insurance agents will take up this matter and will consider as the best risks vessels which are equipped with high-grade steel forgings."

The Germans in Shipping.

The Germans are not going to let the English hold the record for the fastest passage across the Atlantic if they can prevent it. The new ship building at Stettin for the North German Lloyds is to compete with the fastest of the fast transatlantic boats. She is to be a monster in size and her engines are to develop not less than 28,000 horse power. So enthusiastic are some of the Germans over the possibilities in the way of speed of this new boat that they talk of a four-day steamer for their Atlantic trade. They ought to know that a four-day boat is quite possible as a matter of ship building, but that it has not yet been shown that she would be a commercial success. The question of speed depends mostly upon this important point. If it will pay the speed can be had.

That the new German boat will be a flyer and that she will give the English a tussle is beyond question. But what should make this fact of importance to Americans is that the Germans in turning out such a boat present us with an object lesson that should not be disregarded. Today the British have all the advantages in ship building and are easily far ahead of all other builders in almost every respect. To attempt, therefore, to compete with them, and to turn out a merchant steamer—a thing entirely different from building a war vessel where expense is of secondary importance—to excel their very best, is a work of no ordinary magnitude. The Germans work under many disadvantages in ship building, some even greater than our own, and the success which has already attended upon their efforts is therefore all the more commendable. They appreciate fully the advantages that come from the possession of a large merchant marine, and are determined to secure such advantages, despite the almost insurmountable obstacles placed in the way by British possession of the seas. The building of the new fast steamers, and of other fine vessels for her commercial navy, shows how determined Germany is to make the attempt at success. But despite many expressions to the contrary, Americans are better able to undertake a successful competition for the ocean carrying trade than the Germans, and the attempt of the latter should be an incentive to the former to undertake the task. The rewards to the successful in this contest are always great.

When the work of the American-built steamer St. Paul is compared with that of the best of the Atlantic greyhounds, it is manifest that the American builder can turn out steamers as fast as any built, and whatever may be the speed of the new German boat it can be equalled on this side of the Atlantic. It has been demonstrated beyond cavil that the American ship yard can now do work equal to any, and there need be no fear that as far as the question of excellence, speed, and similar qualities are concerned, Americans can put the best vessels on the seas. The question to be settled is whether it is to be the Germans or the Americans that are to give Great Britain a fight for the carrying trade. The Germans are starting in, the Americans will have to go in, but whether now, or when the vital success of their foreign trade will depend upon their owning a merchant navy, is uncertain.—Maritime Register.

Around the Lakes.

A large number of vessels are said to have been reported to the treasury department by the officers on the revenue cutter Johnson, for violation of the regulations relative to the seven-mile speed limit in St. Mary's river.

With regular cargo and a full list of passengers the new side-wheel steamer City of Buffalo has several times of late made the Cleleland-Buffalo run at an average speed of close to 19½ miles an hour, and this using only four boilers. There is no question about these records.

Capt. Geo. McCarthy of Buffalo, who was for a long time connected with the Western line, and who was also interested in the schooner C. H. Burton, died on the 8th. From Bayfield, Wis., the death of Capt. John Stewart is announced. He was in charge of vessels in the Lake Superior region early in the fifties.

Capt. Ralph Lyons, who has brought out the big Duluth steamers Zenith City and Queen City, will also bring out the third Wolvin steamer, the Crescent City, which is to be built at South Chicago during the coming fall and winter. Upon laying up the Queen City in the fall, Capt. Lyons will go to South Chicago to look after the construction of the Crescent City.

From bills of sale recorded at the Milwaukee customs office it appears that the steel tug S. M. Fisher and the two car-carrying barges recently completed by the Craig Ship Building Co. of Toledo for the Lake Michigan Car-Ferry Transportation Co. represents an investment of \$146,000. The tug cost \$60,000 and the barges \$48,000 each. The price paid by the company to E. G. Crosby and others for the tug E. G. Crosby was \$11,500.

Better Treatment for Sailors.

Editor MARINE REVIEW: I have read with a great deal of pleasure the article in your issue of July 2, headed "Change in Plans of Rockefeller Ships," and I would like to congratulate everybody who has been instrumental in bringing this change about. When sailors receive better treatment than has been accorded them in the past there will be a better class of men attracted to a seafaring life, and if we are going to build up our mercantile marine and our navy to compete with that of other nations, we want the best class of men to navigate the vessels that can be obtained. Nothing will contribute more to this end than giving the men better quarters and a better style of living than we have been in the habit of giving them.

I remember the circumstance of an American visiting a British man-of-war who thought he noticed some Yankees among the crew, who were chatting together, and he went up and asked them if they were not Americans. Yes, they said, we are Americans. Well, he remarked, what are you doing on board of a British man-of-war? They replied: "We prefer to go to sea for a living and we are more comfortable on a British man-of-war than we are on any of our own naval vessels, and for that reason we are here."

And to show you how very important it is that men should be made as comfortable as possible on board ship, I will cite the case of the Cunard line and their immunity from accident. I am not sure whether what I am about to state is the case now, but I know that it was a few years ago, viz., that the Cunard was the only line crossing the Atlantic that engaged their men by the year and kept them on board their steamers while they were in a foreign port. The North German Lloyd, at the time to which I refer, engaged their men I believe for six months, but I am not sure whether they kept them on board their steamers while in foreign ports. All the other lines crossing the Atlantic at the time to which I refer engaged their men for a single voyage and discharged them on their arrival at the home port, sometimes going out on the next voyage with almost an entirely new crew. Now, in my opinion, this mode of treating their men on the Cunard and North German Lloyd lines has had a good deal to do with the freedom from accident and loss of life on those two lines. It may be that since the time to which I refer the other lines are adopting the same principle, of making their men attached to the ship and taking some pride in her, instead of having them feel that they are simply making a single voyage which may terminate their connection with the ship at the end of the trip.

Whoever is responsible for this change in the Rockefeller ships, to which you refer, is in my opinion entitled to the thanks of the whole country, and I desire to convey my thanks individually to whoever the responsible party is, and I feel confident that Mr. Rockefeller and those associated with him in his line of steamers will be largely benefited by this action.

C. W. WITNEY,

Manhattan Life Bldg., New York, July 10, 1896.

River Tug Men in Big Steamers.

Editor MARINE REVIEW:—Your allusion in a recent issue of the REVIEW to Capt. E. M. Peck's selection of tug masters for steam barges emphasizes the fact that the A1 masters who have been successful in large lake tugs have been uniformly fortunate in handling steam barges. Among the large number of former tug masters, not one, so far as can be recalled, has met with a serious accident. All have succeeded in keeping their cumbersome charges off the beach and they have had but slight trouble in the rivers. This, it would seem to me, is largely owing to the fact that all first-class tug men had a training in pilotage and handling large tows, and were required to have the necessary business qualifications which specially fitted them for large commands. Garfield, the McGregors, Inman, Cox, Ivers, Cornwall, the Hutchinsons, Sinclair, Mil-len, Brown, Chris Smith, Gerardin and others, are names of masters that owners and insurance companies will find conspicuously absent in wreck adjustments.

ANCIENT MARINER.

Tacoma, Wash., July 6, 1896.

It is expected that improvements now under way at Manitowoc will make that harbor one of the deepest on Lake Machine. Three dredges are now at work—one between the entrance piers and two inside. The North-Western railway management proposes to be on terms of equality with the Wisconsin Central at Manitowoc, and they have accordingly contracted with the Chicago Dredge and Dock Co. to dredge a slip just inside of the south harbor pier, and construct a protecting breakwater 3,000 feet long 60 feet outside of the shore line. This slip is to be utilized for the transfer of cars to and from the Flint & Pere Marquette and Toledo & Ann Arbor car ferry steamers, and also for handling coal and general merchandise.

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Ship Yard Matters.

There is considerable talk of the American Steel Barge Co. undertaking the construction of more whalebacks on their own account, but in view of the condition of freights it is not probable that the conservative management of the West Superior works will add any more vessels to its fleet this fall. The two barges, 201 and 202, just brought from the coast will undoubtedly be lengthened, as they are only 192 feet long, and it is probable also that another dry dock, a small one, will also be built, but this will probably be the extent of new undertakings by the barge company on its own account. It is thought that a second dock would prove profitable for miscellaneous repair work and small jobs, as it could be operated in connection with the present big dock at West Superior at low cost.

Saml. F. Hodge & Co., Detroit, are fitting a new sectional wheel to the steamer E. W. Oglebay, with a view to improving her performance. It was shipped to Chicago last week and will be placed there. They are also making a new high pressure cylinder for the John Owen and expect to improve her fuel consumption materially. Their business in propeller wheels this season has been most remarkable, over fifty having been made within the last few months. The cylinders, crank shaft, etc., which these works furnished for the Merida, have been completed and are in place. A considerable amount of stationary work is also finding its way into their hands.

Capt. James Davidson of West Bay City has two wooden tugs under way, in addition to the two freight steamers that are nearing completion. One of the tugs is for B. B. Inman of Duluth and the other will be for sale. They are duplicates—90 feet long, 20 feet beam and 10 feet depth in the shoalest part. Capt. Inman will take machinery from an old tug for his new boat, but the boat building for sale will have new machinery of high power. Engines will be for-and-aft compound, with cylinders about 16 and 30 inches diameter by 30 inches stroke and with an independent condenser.

The Detroit Dry Dock Co. has just issued, with substantial paste-board binding, a set of instructions to engineers who are in charge of vessels fitted with the Howden system of hot draft. The great increase in the number of lake vessels adopting this draft, and the enthusiasm shown by owners and engineers who have adopted it, is a source of great encouragement to the dry dock company, and arrangements are being made to direct attention to its merits everywhere on the lakes, both for new vessels and vessels already in commission.

The Craig Ship Building Co of Toledo has not as yet verified the report that they have a contract with Manager Boynton of the Central Michigan Railroad Co. for two steam car transfers, which are said to be intended for service between Grand Haven and Milwaukee, and which, according to report, are to have a capacity for thirty-four cars.

The new Union line package freight steamer Ramapo, building at the works of the Union Dry Dock Co., Buffalo, is about fully plated and will be launched shortly, but work is not being rushed on her, on account of the depressed condition of the freight market.

Tonnage of the Duluth steamer Queen City, as fixed by the treasury department, is 3,979.68 gross and 3,198.15 net. Her official number is 20,612.

Fast Freight Steamers.

Referring to the article in last week's REVIEW about the speed of the Centurion and the new steamer E. W. Oglebay, a correspondent says:

"This reference to the Centurion's speed brings to mind a little race, which took place last fall, and about which very little has ever been said; in fact only the few people on the two boats knew what was up. It occurred between the yacht Bonita, owned by Mr. Mark Hopkins, and one of the fastest yachts on the river, and the Centurion. Friends of Mr. Hopkins had at different times joked him regarding the relative speed of the two vessels in which he is interested. He always scorned the idea of the Centurion being anything like a match for the trim little yacht. Accordingly, the Bonita was in waiting below Port Huron for the Centurion on a trip when she was bound up light, and the two passed Fort Gratiot light side by side, but as the big boat got out in the deep water, the yachts were obliged to keep on increasing their speed until they were at full speed. They continued in this way for about 20 miles up the lake, the Bonita being unable to go by the big boat, and in fact those on the yacht were so fearful she was going to get the worst of the race that an order was finally given to put her about. The Centurion's engines were turned at least 110 turns a minute on this occasion, and those acquainted with the Bonita will appreciate the fact that the big boat was making a pace faster on this occasion than she has ever been given credit for. If the Oglebay can beat the Centurion, as her friends claim, she will have to go very fast, and she will prove herself a boat to be proud of. The engines of the two steamers are practically duplicates."

The Nickel Plate road sells tickets at rates lower than other routes.

174-July 31.



DEVOTED TO THE LAKE MARINE AND KINDRED INTERESTS.

Published every Thursday at No. 409 Perry-Payne building, Cleveland, O by John M. Mulrooney and F. M. Barton.

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The books of the United States treasury department on June 30, 1895, contained the names of 3,342 vessels, of 1,241,459.14 gross tons register in the lake trade. The number of steam vessels of 1,000 gross tons, and over that amount, on the lakes on June 30, 1895, was 360 and their aggregate gross tonnage 643,260.40; the number of vessels of this class owned in all other parts of the country on the same date was 309 and their tonnage 652,598.72, so that half of the best steamships in all the United States are owned on the lakes. The classification of the entire lake fleet on June 30, 1895, was as follows:

Class.	Number.	Gross Tonnage.
Steam vessels.....	1,755	857,735.13
Sailing vessels.....	1,100	300,642.10
Unrigged.....	487	83,081.91
Total.....	3,342	1,241,459.14

The gross registered tonnage of vessels built on the lakes during the past five years, according to the reports of the United States commissioner of navigation, is as follows:

Year ending June 30,	Number.	Gross Tonnage.
1891.....	204	111,856.45
" " " 1892.....	169	45,968.98
" " " 1893.....	175	99,271.24
" " " 1894.....	106	41,984.61
" " " 1895.....	93	36,352.70
Total.....	747	335,433.98

ST. MARY'S FALLS AND SUEZ CANAL TRAFFIC.

(From Official Reports of Canal Officers.)

	St. Mary's Falls Canal.			Suez Canal.		
	1895.*	1894.	1893.	1895.	1894.	1893.
No. vessel pass'ges	17,956	14,491	12,008	3,434	3,352	3,341
T'n'ge, net registd	16,806,781	13,110,366	9,849,754	8,448,383	8,039,175	7,659,068
Days of Navigat'n	231	234	219	365	365	365

* 1895 figures include traffic of Canadian canal at Sault Ste. Marie, which was about ¼ per cent. of the whole, but largely in American vessels.

THE WATER TUBE boiler question, which is attracting so much attention in England, has again disturbed the House of Commons. Three British war vessels of the largest size are now fitted with Belleville boilers, eight are being fitted with them and twelve are to be fitted with them. The aggregate maximum horse power of these vessels is to be 322,700, and their total displacement is to be 222,235 tons. It will thus be seen that the admiralty has gone into the Belleville boiler business on a big scale, and it is not surprising, therefore, to find that they are still being fought by builders of the older type of marine boilers, who have large interests in boiler works. Comment in the English journals regarding the latest discussion in the House of Commons is not, however, favorable to the attack on the government for adopting the French type of boilers. The disposition in engineering circles now is rather in favor of giving the admiralty an opportunity, now that they have taken up the boilers on such a big scale, to show what can be done with the new generators in the Powerful and Terrible, which were the first of the big ships to be fitted with them. "It has been learned," says the Engineer of London, "that during her trials on the Clyde the Terrible, with 100 revolutions, attained a speed of 20½ knots, and with 105 revolutions 21½ knots. She recently left Helensburgh for Portsmouth, using only twenty four out of her forty-eight boilers, and two hours after starting, with seventy revolutions, she attained a speed of 15 knots, which she maintained till she arrived at Spithead, a run of about forty hours. She had fine weather, with smooth sea, but an adverse tide for the greater part of the distance, but no difficulty was experienced in keeping a uniform speed, and the Belleville boilers worked very satisfactorily. The machinery and boilers gave, indeed, no trouble of any kind, and the speed would have been better but for the fact that she is at present only wood sheathed and has been in the water for thirteen months, having been launched in May, 1895. On one point we rest content. We feel sure that the Belleville boiler is not going to prove worse than the normal navy Scotch boiler has done, and it is even possible that it may do very much better. It is very difficult to obtain much information from anyone or in any place about the failures which

are said to occur. No doubt it is a very peculiar piece of mechanism; but when its idiosyncracies are thoroughly understood, it will probably be found amenable to discipline, and to supply plenty of dry steam without much risk of a breakdown; and that is quite as much, if not a little more than can be truthfully said of any other form of steam generator in use in the navy."

VESSEL owners who entered into contracts early in the season to carry large quantities of freight are congratulating themselves, now that the freight market has gone to pieces. As usual Capt. James Davidson of West Bay City was among the lucky ones. He had 800,000 bushels of wheat, Duluth to Buffalo, at 3½ cents, and 500,000 bushels at 2½ cents, in addition to 100,000 tons of ore at \$1 and 50,000 tons of coal, Ohio ports to the head of Lake Superior, at 42½ cents. If Capt. Davidson was compelled to carry these amounts of grain, ore and coal at the rates prevailing to-day the difference in gross freights to him would be \$67,250. This does not mean, of course, that he has gained such a large amount of money by accepting the contracts, but the actual difference in earnings due to the contracts is certainly a big item. The contracts referred to are not by any means sufficient to furnish steady employment during the season for the big Davidson fleet of steamers, but the business involved in them comes in very handy during the dull period. James McBrier of Erie is another owner who seems to have been on the right side of late. Last season he profited by having his wooden steamers free of contract engagements, and now with an unfavorable turn in wild freights he has 50,000 tons of contract ore for these vessels, while his steel steamer, the Emily P. Weed, is engaged on a profitable season charter in one of the package freight lines.

A CORRESPONDENT at Sault Ste. Marie, Mich., asks: "Does a man require to have master's papers to sail an American sailing vessel in any waters?" Certainly not on the lakes nor in the coasting trade in any part of the United States; neither do we know of any law demanding qualifications of any kind of a master of a sailing vessel engaging in foreign commerce. Of course, it is well understood that masters of vessels of all kinds in the United States must be citizens of the United States. This must be sworn to in obtaining a license for the vessel. But there is no law as to the fitness of the captain of a sailing vessel for the position which he occupies. In this regard everything depends upon the requirements of owners and underwriters. It is unfortunate that such is the case. Laws suited to sailing vessels should be made almost as stringent as those relating to steam vessels.

A STEEL steam yacht that is the product of a Cleveland ship yard will be at the service of Major McKinley and his friend, Mr. M. A. Hanna of Cleveland, during the month of August. The yacht Comanche, which is owned by Mr. H. M. Hanna, brother of the chairman of the national Republican committee, and which was built by the Globe Iron Works Co., in which the Messrs. Hanna are leading stockholders, is now in Brooklyn and will be used by Major McKinley and Mr. M. A. Hanna during the coming month.

Great Pressure on a Diving Bell.

A crushed mass of iron now lying in a scrap yard at Pittsburg demonstrates the tremendous pressure of water at a great depth. It was constructed for a diving bell, and was intended for use in Lake Michigan. As originally constructed it was a cube about 6 feet square, tapering slightly at both ends. The material was phosphor bronze, ⅝-inch thick. Each plate was cast with a flange and they were bolted together, the bolts being placed as closely together as was consistent with strength. The side plates were further strengthened by ribs 1 inch thick and 2 inches wide, and the entire structure was strongly braced. The windows intended to be used as outlooks by the divers inside, were three inches square, fortified with iron bars and set with glass plates 1 inch thick. The entire weight of the bell was 23,000 pounds. When completed it was sent to Milwaukee and towed out into the lake about twelve miles, where there was over 200 feet of water, and was sent down for a test. The manufacturer of the bell was so confident of its strength that he wanted to go down in it on the test trip. It was well he did not. When it reached a depth of about 200 feet, strong timbers which had been attached to it came to the surface in a splintered condition. Suspecting an accident, the bell was hauled up and found to be crushed into a shapeless mass. The inch-thick plate glass bull's eyes were pulverized and the entire body of the bell forced inward until none of its original outlines remained. On a basis of 200 feet depth, the pressure that crushed this seemingly invulnerable structure was 86.8 pounds per square inch, or 353,924 pounds to each side of 6 feet square. The total pressure, therefore, on the cube was 2,723,548 pounds, or 1,361 7 tons.—Exchange.

Homeseekers excursion to the west and southwest July 21st. Tickets at lowest rates are on sale via the Nickel Plate road.

172-July 20.

Points in Admiralty.

The question of amount to be awarded as compensation in salvage services is constantly recurring on the lakes. Large demands are frequently made, and some of the awards on hearing are, under all the circumstances, by many considered too large. The policy of marine law has made the award rest almost entirely within the discretion of the trial courts, and an appellate court will rarely disturb the award unless the amount be palpably excessive. Some well considered cases lay down general rules for the guidance of the district judges, but the discretion reposed in the judge is almost absolute and under the varying circumstances is very elastic. Each case of salvage must necessarily be determined upon its peculiar facts, and the earlier cases are of little value. The circumstances attending maritime adventures, the increased number of vessels, the more widely diverging courses, the great speed, the ease with which a modern vessel is handled, the perfect equipment, and speedy communication between almost all parts of the world, all tend to lessen the amount of an award in such cases.

When we come to our great lakes, the same considerations are present and modify the service vastly more than upon the ocean. The same award should not be granted. The services, save in a few exceptional cases, are not the same, and yet the average of the awards is probably as large as on the coast. Several of the cases recently decided in district courts are now before the circuit courts of appeal. In one, at least, the facts are practically undisputed—the value of the property, and time of service, and need of immediate assistance to salvaged vessel. It seems a case in which the court may very properly lay down some general rule for the district court of that circuit, whether the award be reduced or not.

Under the modified conditions of our navigation, it would seem that the court of appeals for the fifth circuit, gives announcement to a sound rule, (the *Gambetta*, 74 Fed. 259): "It is compensation for actual service rendered, and a reasonable gratuity for the benefit of commerce." The amount above actual compensation for the service should be large enough to insure prompt assistance where moral obligation may be weak, but it ought not amount to a penalty, imposed for being unfortunate. In the case quoted from, a vessel valued with cargo at \$108,600, towed another vessel valued with cargo at \$26,500 from the Caribbean sea to the mouth of the Mississippi, 520 miles, being engaged two and a half days in the service and delayed twelve or fourteen hours, and was allowed \$2,216 66⅔ for the service, against a demand for \$6,000. The doctrine announced is far from being new, but it is lost sight of occasionally.

In respect to liens for supplies, etc., the admiralty certainly favors the vigilant, and he who sleeps on his right is very apt to awake to its loss. To the other circumstances, which will defeat a lien, must now be added forfeiture to the United States. In the *Louis Olsen*, (74 Fed. Rep. 1), Judge Bellinger says: "A forfeiture necessarily, as it seems to me, divests every existing right, whether of title or lien, or other interest in the thing forfeited. There is no reason why it should not extinguish the right of a lien holder, equally with that of the owner."

Stocks of Grain at Lake Ports.

The following table, prepared from reports of the Chicago board of trade, shows the stocks of wheat and corn in store in regular elevators at the principal points of accumulation on the lakes on July 11, 1896:

	Wheat, bushels.	Corn, bushels.
Chicago.....	13,462,000	4,948,000
Duluth.....	7,499,000	25,000
Milwaukee.....	404,000	2,000
Detroit.....	116,000	11,000
Toledo.....	301,000	37,000
Buffalo.....	1,014,000	363,000
Total.....	22,796,000	5,386,000

As compared with a week ago, the above figures show at the several points named a decrease of 410,000 bushels of wheat and 257,000 bushels of corn.

As indicating the great increase of pressure in the boilers of steam vessels, it was stated at a meeting of marine engineers in London recently that in 1885 there were 122 vessels of the British fleet with a boiler pressure under 60 pounds, while in 1895 there were only 40; in 1885 there were 1,650 vessels with boiler pressures of 80 pounds to 90 pounds, against 1,101 vessels in 1895; fourteen vessels of 160 pounds boiler pressure in 1885, against 2,200 vessels in 1895; and three vessels above 160 pounds, against 416 vessels last year.

The Blue Book of American Shipping answers questions that arise daily in every vessel agent or owner's office. If the book is not satisfactory it costs nothing, as the \$5 will be returned. Order at once, No. 409 Perry-Payne building, Cleveland.

For Sick and Disabled Seamen.

Walter Wyman, supervising surgeon-general of the United States marine hospital service, has again made contracts for the care of sick and disabled seamen at different points in the United States for the fiscal year that will end with June 30, 1897. Contracts have been entered into with the following parties on the lakes:

Lake Ontario: Oswego—Medical attendance to be furnished by an acting assistant surgeon Oswego hospital to furnish quarters, subsistence, nursing and medicines at \$1 a day. Ogdensburg—Medical attendance by an acting assistant surgeon; City hospital to furnish quarters, subsistence, nursing and medicines at \$1 a day; city of Ogdensburg to care for contagious cases at \$3 a day; H. S. Nutall to provide for burial of deceased patients at \$9.45 cents each.

Lake Erie: Buffalo—Medical attendance by a medical officer of the Marine hospital service; Buffalo hospital (sisters of charity) to furnish quarters, subsistence, nursing and medicines at 80 cents a day; contagious diseases at \$2 a day; and to provide for burial of deceased patients at \$10 each. Erie—Medical attendance by an acting assistant surgeon; Hamot hospital association to furnish quarters, subsistence, nursing and medicines at 71 cents a day; care and treatment of cases of contagious diseases to be furnished by the health department of the city of Erie at \$2.85 a day. Ashtabula—Medical attendance by an acting assistant surgeon; Mrs. Henry Whelpley to furnish quarters, subsistence and nursing at \$1 a day; contagious diseases, \$1.50 a day; John Ducro & Sons to provide for burial of deceased patients at \$14 each. Cleveland—Hospital patients to be cared for in the United States marine hospital; Hogan & Sharer to furnish ambulance service at \$2 for each patient and to provide for burial of deceased patients at \$16 each. Sandusky—Medical attendance by an acting assistant surgeon; Good Samaritan hospital to furnish quarters, subsistence and nursing at \$1 a day. Toledo—Medical attendance by an acting assistant surgeon; Toledo hospital association to furnish quarters, subsistence, nursing and medicines at 80 cents a day; contagious diseases at \$2 a day, and to provide for burial of deceased patients at \$15 each.

River points: Detroit—Hospital patients to be cared for in the United States marine hospital; out patients to be treated at the dispensary, No. 90 Griswold street; Ed. H. Patterson to provide for burial of deceased patients at \$10 each. Port Huron—Medical attendance by an acting assistant surgeon; Hospital and Home to furnish quarters, subsistence, nursing and medicines at \$1 a day; George Thompson to provide for burial of deceased patients at \$10 each. Sault Ste. Marie—Medical attendance by an acting assistant surgeon; Annie McNeeley to furnish quarters, subsistence and nursing at 70 cents a day; J. Vanderhook to provide for burial of deceased patients at \$15 each.

Lake Huron: Saginaw—Medical attendance by an acting assistant surgeon; St. Mary's hospital to furnish quarters, subsistence, nursing and medicines at 64 cents a day.

Lake Michigan: Chicago—Hospital patients to be cared for in the United States marine hospital; Bartlett & Co. to provide for burial of deceased patients at \$18 each. Milwaukee—Medical attendance by an acting assistant surgeon; St. Mary's hospital to furnish quarters, subsistence, nursing and medicines at 80 cents a day; George L. Thomas to provide for burial of deceased patients at \$14 each. Grand Haven—Medical attendance by an acting assistant surgeon; Anna Farnham to furnish quarters, subsistence and nursing at \$1 a day. Manistee—Medical attendance by an acting assistant surgeon; Mercy hospital to furnish quarters, subsistence, nursing and medicines at 90 cents a day. Ludington—Medical attendance by an acting assistant surgeon; Hanibal D. Linsley to furnish quarters, subsistence and nursing at 80 cents a day. Escanaba—Medical attendance by an acting assistant surgeon; Delta County hospital to furnish quarters, subsistence and nursing at \$1 a day. Green Bay—Medical attendance by an acting assistant surgeon; St. Vincent's hospital to furnish quarters, subsistence, nursing and medicines at \$1 a day; Lefebvre & Schumacher to provide for burial of deceased patients at \$16 each.

Lake Superior: Ashland—St. Joseph's hospital to furnish quarters, subsistence, nursing, medical attendance and medicines at \$1 a day, and to provide for burial of deceased patients at \$10 each. Marquette—Medical attendance by an acting assistant surgeon; St. Mary's hospital to furnish quarters, subsistence, nursing and medicines at \$1 a day, and to provide for burial of deceased patients at \$15 each. Duluth—Medical attendance by an acting assistant surgeon; St. Luke's hospital to furnish quarters, subsistence, nursing and medicines at 75 cents a day; John W. Stewart to provide for burial of deceased patients at \$15 each. Superior—Medical attendance by an acting assistant surgeon; St. Mary's hospital to furnish quarters, subsistence, nursing and medicines at 90 cents a day; Patrick O'Reilly to provide for burial of deceased patients at \$15 each.

A ticket to Chicago via the Nickel Plate road is sold for \$1.50 less than via other lines. A perfect passenger service. 153-July 31

Cargo and Speed Records—Lake Freight Ships.

There is now practically no doubt of all of the Rockfeller ships carrying full 4,000 gross tons from Lake Superior on the present draft of about 14 feet 4 inches. The first of these ships, the Sir Henry Bessemer, has just delivered at Cleveland from Ashland 4,051 gross, or 4,537 net tons, which is the largest cargo of any kind ever moved from Lake Superior. But 4,000-ton cargoes will be small next season, when dredging operations throughout the rivers afford to vessels of this kind a draft of water equal to the greatest depth that can be had at Lake Erie ports. Predictions in this regard might be wide of the mark just now, but it is certainly reasonable to expect that 6,000-ton loads will be as common next year as those of 4,000 tons are at present. The barge Aurania, owned by John Corrigan of Cleveland, has again taken first place among the steel tow barges in the Lake Superior trade. She is now bound down from Duluth with 4,034 gross, or 4,520 net tons of ore. Following is the corrected cargo record to date:

Iron ore—Coralia, Mutual Transportation Co. of Cleveland, 4,738 gross or 5,307 net tons, Escanaba to Ashtabula, draft of 16 feet 1½ inches; S. S. Curry, Hawgood & Avery Transit Co. of Cleveland, 4,569 tons gross or 5,117 net tons, Escanaba to South Chicago, draft of 18 feet. Lake Superior cargoes—Steamer Sir Henry Bessemer, Bessemer Steamship Co. of Cleveland, 4,051 gross or 4,537 net tons, Ashland to Cleveland, draft of 14 feet 5 inches; schooner Aurania, John Corrigan of Cleveland, 4,034 gross or 4,520 net tons, Duluth to Ashiabula, draft of 14 feet 5 inches.

Grain—Steamer Queen City, A. B. Wolvin of Duluth, 151,000 bushels of wheat, Duluth to Buffalo, 14 feet 4 inches draft; steel schooner Martha, Minnesota Steamship Co., 165,000 bushels of corn, South Chicago to Erie on 15 feet draft; S. S. Curry, Hawgood & Avery Transit Co. of Cleveland, 246,673 bushels of oats, Chicago to Buffalo.

Coal—S. S. Curry, Hawgood & Avery Transit Co. of Cleveland, 4,535 net tons bituminous, Conneaut to Gladstone; Selwyn Eddy, Eddy Bros. of Bay City, Mich., 4,252 net tons anthracite, Buffalo to Milwaukee.

Speed—Owego, Union Line of Buffalo, Buffalo to Chicago, 889 miles, 45 hours and 16 minutes, 16.4 miles an hour; Centurion, Hopkins Steamship Co. of St. Clair, Mich., Buffalo to Duluth, 997 miles, 67 hours and 50 minutes, 14.7 miles an hour.

Trade Notes.

John Platt & Co., consulting engineers, Fidelity building, New York, are now the sole agents in the United States for the Thornycroft water tube boiler. They have just issued a very interesting pamphlet regarding this boiler, which is probably better known than any generator of its kind ever manufactured.

A baby liquid compass that will find sale on account of size, price and performance, is the latest thing out for small yachts and canoes. It is supplied by T. S. & J. D. Negus, No. 140 Water street, New York, and is said to fill a long-felt want in the line of a compass that can be relied upon in a small and unsteady craft.

Eight Babcock & Wilcox water tube boilers have for some time past been in position in the big passenger steamer Grand Duchesse, the new ship for the Plant System, which is nearing completion at the works of the Newport News Ship Building & Dry Dock Co., Newport News, Va. The operation of this large battery of modern marine boilers in a big steamer will be watched with a great deal of interest.

Officers of the Gas Engine & Power Co., Morris Heights, New York, do not allow reports of naphtha explosions in pleasure vessels built by them to pass by default. An investigation of the accident on the twin-screw naphtha yacht Thelma, which was burned on Long Island sound recently, shows that the fire was caused by the engineer removing the injector valve from the retort of one of the engines, while the other engine was running under pressure with the regular fire under the retort. The naphtha vapor escaping through the opening left by the disconnected valve ignited from the flame under the retort of the other engine, and the yacht being under way, caused a draft to fan the flames, thereby communicating with the wood work. These facts are substantiated by a letter from J. Adolph Mollenhauer of Brooklyn, owner of the boat, who makes precisely the same statement of the accident and adds that his confidence in the safety of naphtha boats is such that he will place an order with the Gas Engine & Power Co. at an early date for another boat.

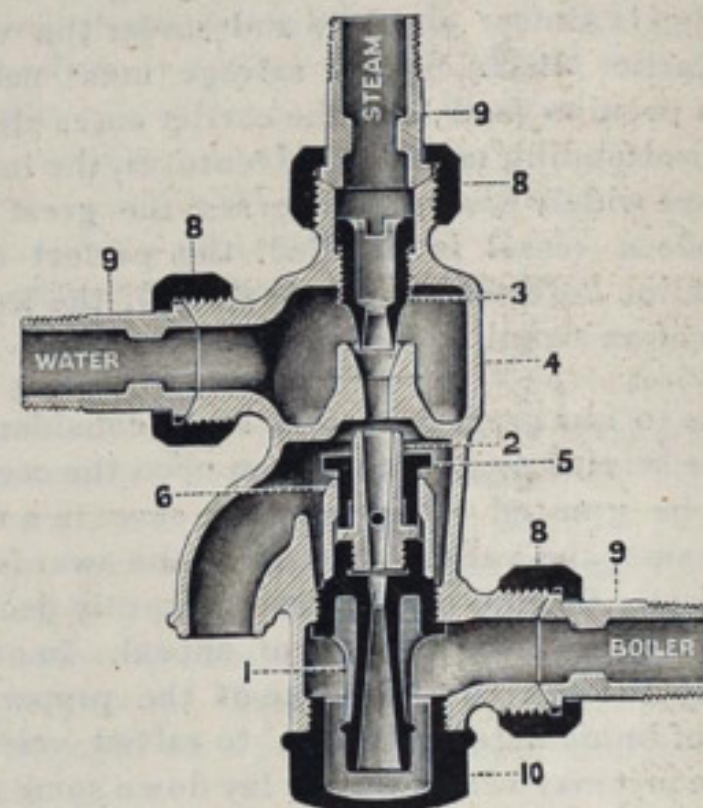
Commander Sigsbee, U.S.N., in charge of the hydrographic office, has ordered fourteen copies of the Blue Book of American Shipping, for use in the Washington office and in the branch offices throughout the country that are connected with the service. This is a fair indication of the value of the book.

The Nickel Plate road sells homeseekers' excursion tickets to the south, June 16, July 17 and 21, Aug. 4 and 18, Sept. 1 and 15, Oct. 6 and 20. For detailed information write any agent of the Nickel Plate road, or address B. F. Horner, general passenger agent, Cleveland, O. 108-30

New Automatic Restarting Injector.

A sectional view of a new automatic restarting injector, lately brought out by Wm. Sellers & Co., Incorporated, Philadelphia, and for which Jenkins Bros. of 71 John street, New York, are selling agents, is presented herewith. The New York firm says of this injector:

"It was designed for use on stationary and portable boilers, traction and hoisting engines, tug boats, etc. The house of Wm. Sellers & Co. has a wide reputation as makers of high class injectors for locomotive and other service. The injectors made by this house are the most per-

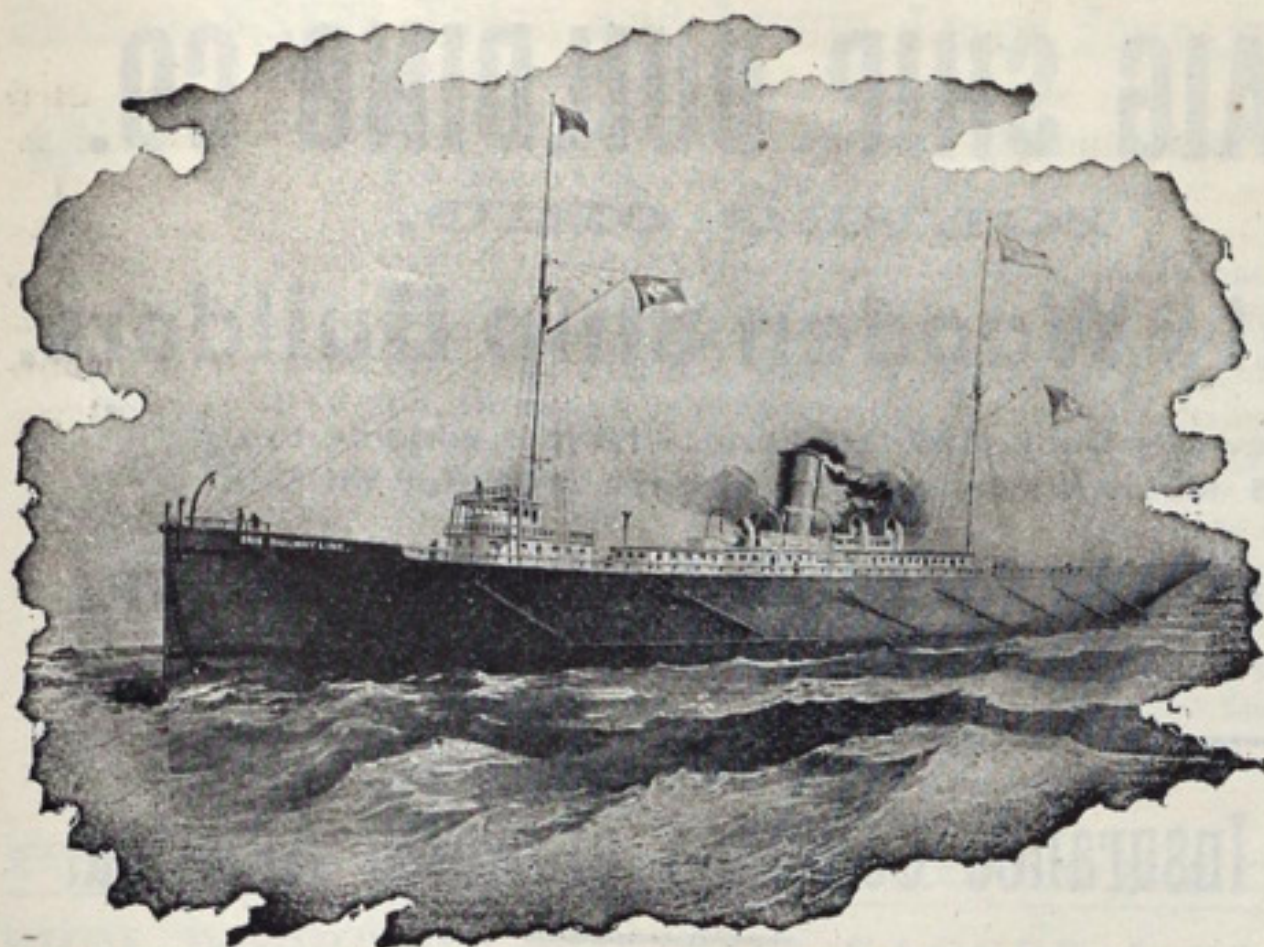


fect boiler feeders known, and are the result of many years of careful and scientific study and experiment to determine the proportions and shapes that will give the widest possible range, with the most economical consumption of steam, and at the same time be perfectly reliable. Their system of manufacture is such that the pipe sizes and proportions having once been determined, they are strictly maintained by having parts made to a perfect system of gauges, so that they are thoroughly interchangeable and, although this injector may have been in service until quite well worn, a new tube or part can be furnished that will fit perfectly and give exactly the same results as the original. This new restarting injector is made in the same careful manner, is thoroughly automatic in every respect and has been designed with a view of having as few parts as possible. There are no levers; no fittings except ordinary globe valves are required, and it is very easily repaired, only a screw driver and a monkey wrench being necessary to take it apart for cleaning or for renewing parts. In designing this injector particular care has been exercised to obtain a wide range, to enable it to work hot water and to get maximum lift. It will be noticed that there is no valve or other obstruction in the overflow, so that when the injector is out of service, if the steam supply valve should leak, there is no danger of heating the water in the service pipe to a very high temperature. Fourteen sizes are made, covering a range of horse power from 2 to 400. This injector is meeting with great favor from steam users."

The Minnesota Iron Company.

Some important facts regarding the operations of the Minnesota Iron Co., which owns all the stock of the Duluth & Iron Range Railroad Co., are noted in reports of the last annual meeting of this big corporation. This is the mining company for which Pickands, Mather & Co. of Cleveland are sales agents. Up to Jan. 1, 1896, the mines of Minnesota controlled by this company had produced 9,393,287 gross tons of ore. This included 4,720,364 tons from the Minnesota, 3,321,462 tons from the Chandler, 485,180 tons from the Auburn, 597,289 tons from the Canton, 136,601 tons from the Fayal and 132,391 tons from the Norman. The production of these mines in 1895 was 2,003,767 tons, against 1,369,575 tons in 1894 and 830,649 in 1893. The company owns absolutely all of these mines excepting the Chandler and they own a controlling interest in that mine. The rail and dock capacity of the railroad company is sufficient to handle 3,000,000 tons of ore a year. The company's steamship line numbers eight steel steamers and four steel consorts, and another steamer and consort will be ready for service next month. These ten vessels are worth about \$2,000,000. The railroad company has a land grant from the state of Minnesota calling for 610,000 acres of land, of which over 300,000 acres have already been deeded. The Minnesota Iron Co. owns in fee and through its sub-companies 41,550 acres and has under lease 3,150 acres.

To those who contemplate taking a summer outing, the Detroit & Cleveland Steam Navigation Co. will mail for 2 cents postage an illustrated pamphlet, which contains a large number of fine engravings of every summer resort between Cleveland, Toledo, Detroit and picturesque Mackinac. It has many artistic half-tones of points of interest in the upper lake region. A. A. Schantz, Detroit, Mich., is the general agent.



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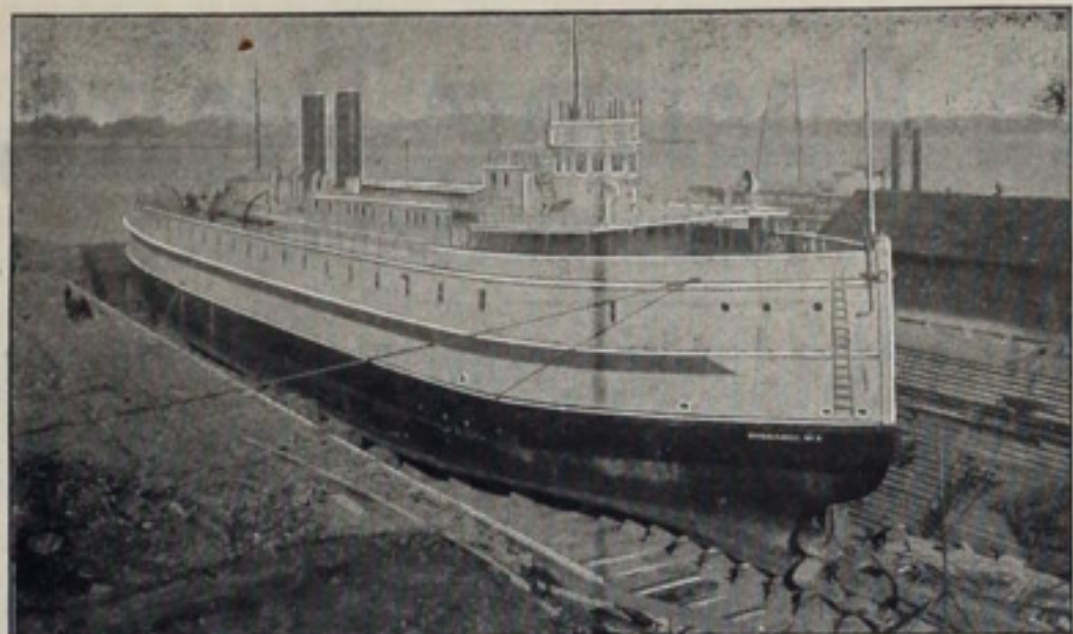
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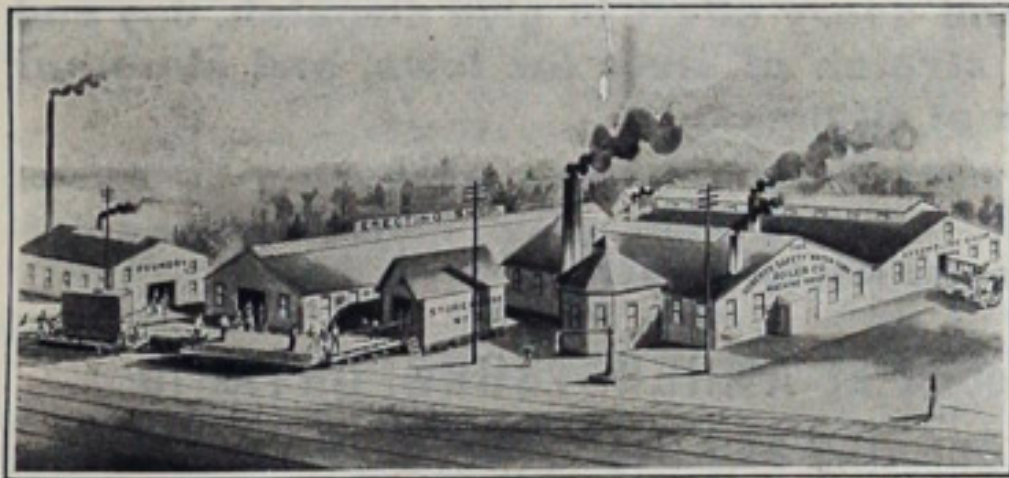
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55 feet wide on bottom, 16 feet of Water on Sill.

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Chicago, Jan. 13, 1896.

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Yours truly,
A. E. CLARK.

THE ROBERTS BOILER is the Cheapest, Best and Lasts Longest
Adapted for use in Yachts, Launches, and Vessels of all Kinds.

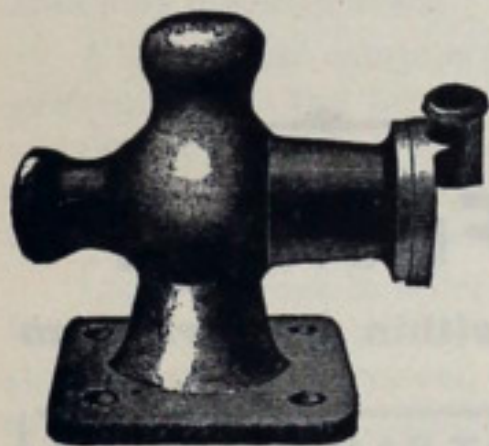
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WORKS, RED BANK, N. J. 39 & 41 Cortlandt St., NEW YORK.

PROPOSALS FOR IMPROVING ERIE HARBOR, Pa., U. S. Engineer office, D. S. Morgan Building, Buffalo, N. Y., June 19, 1896. Sealed proposals for dredging, and furnishing and placing rip-rap stone at Erie Harbor, Pa., will be received here until 11 o'clock A. M., July 20, 1896, and then publicly opened. Information furnished on application. T. W. SYMONS, Major, Engrs. July 18.

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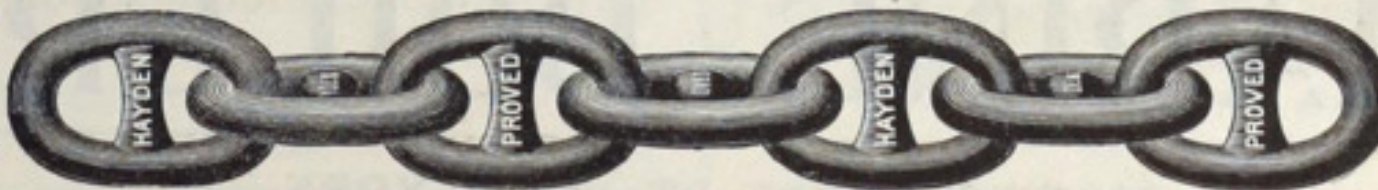
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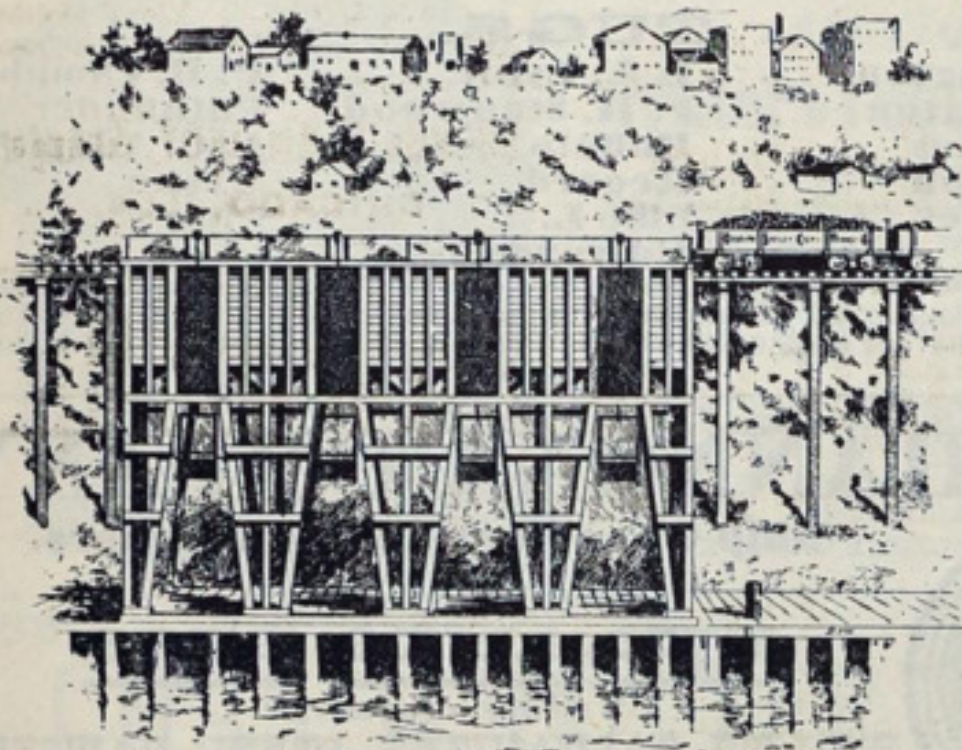


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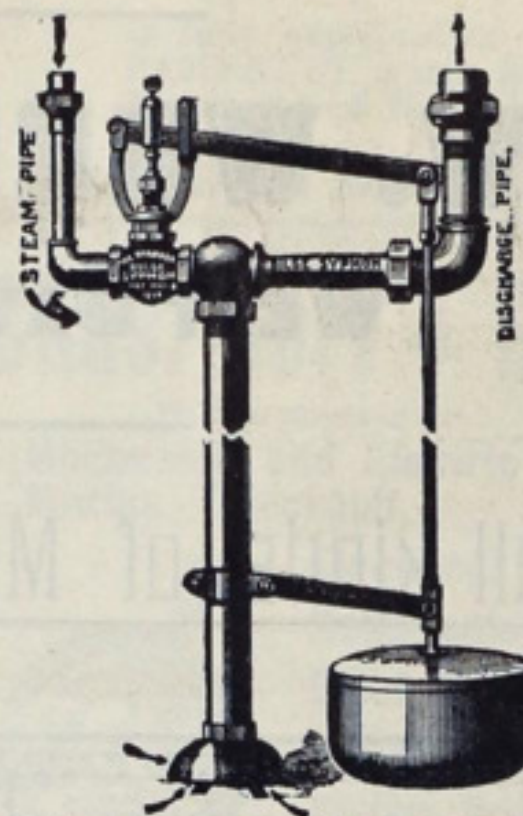
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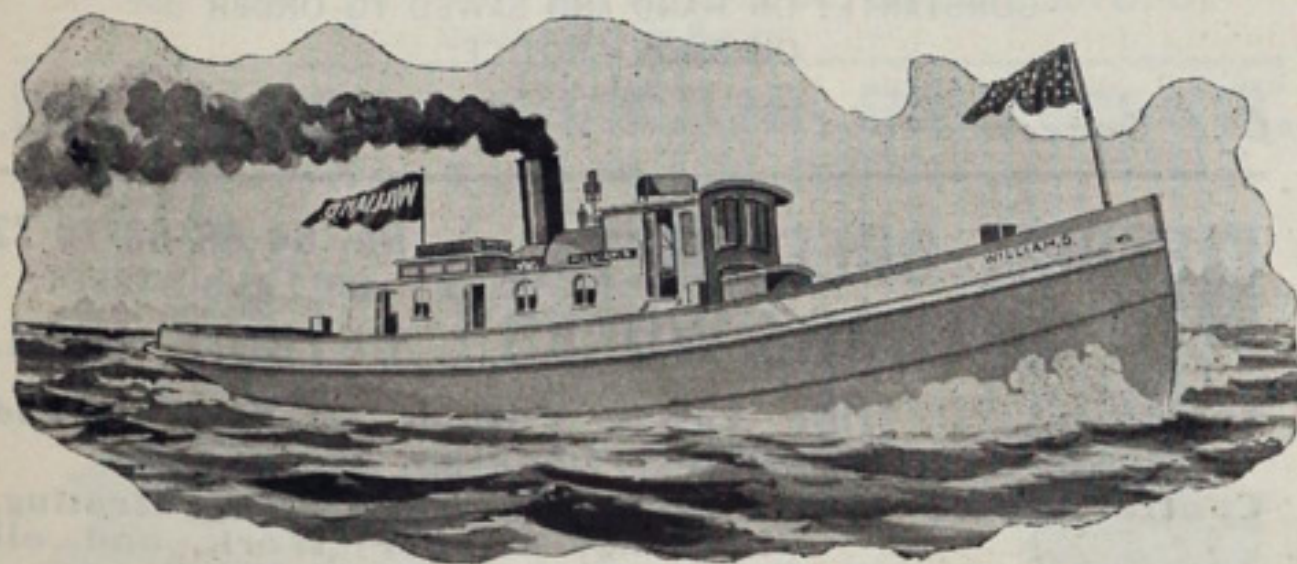
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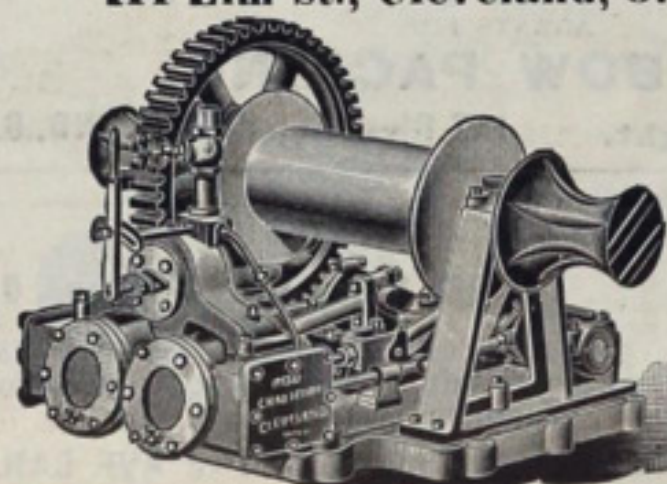
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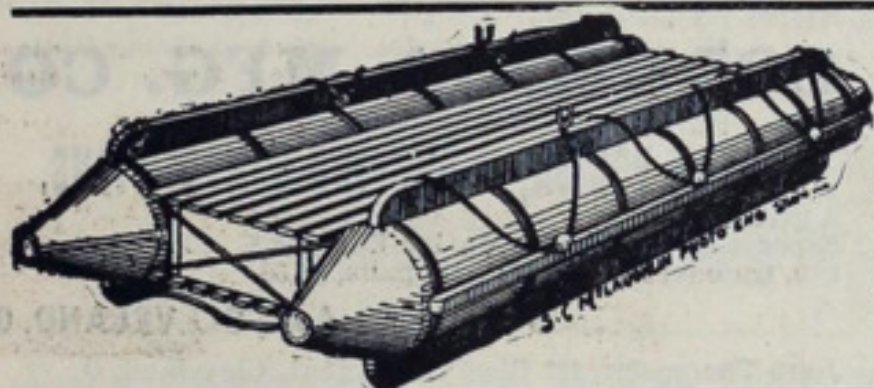
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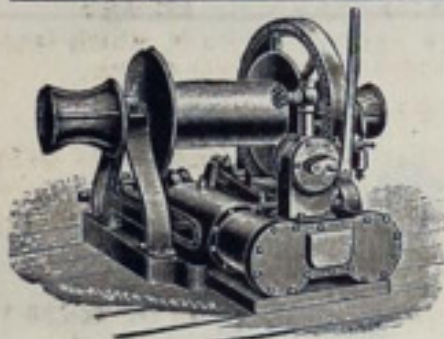
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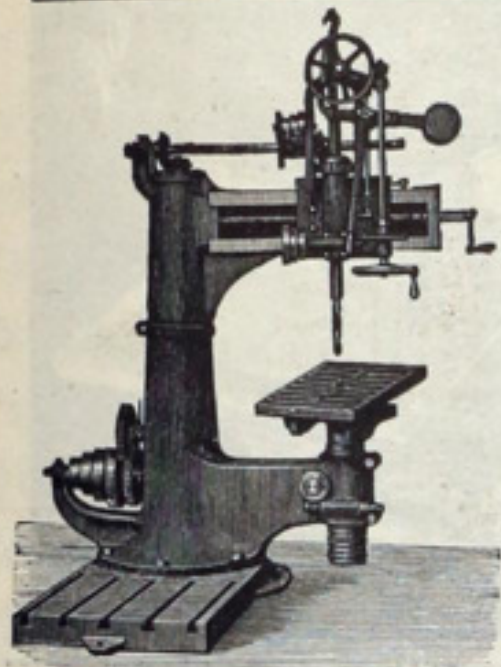
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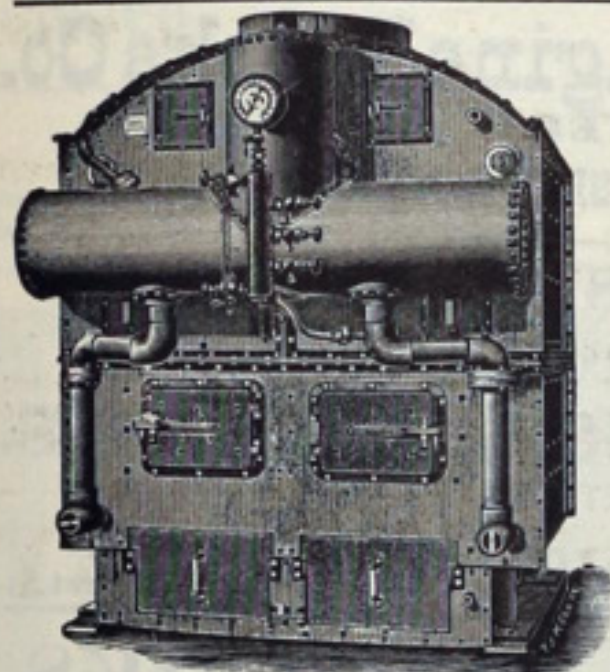
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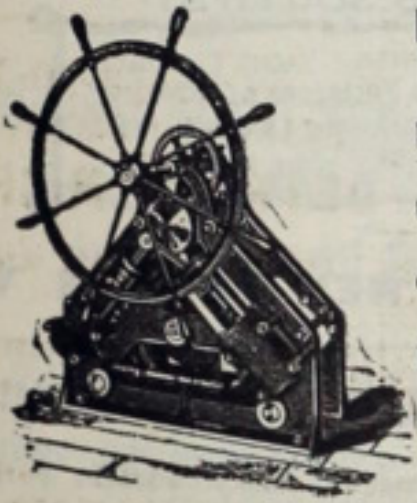
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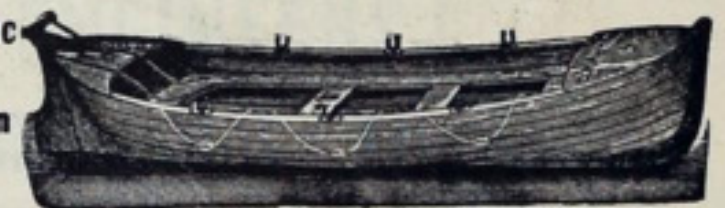
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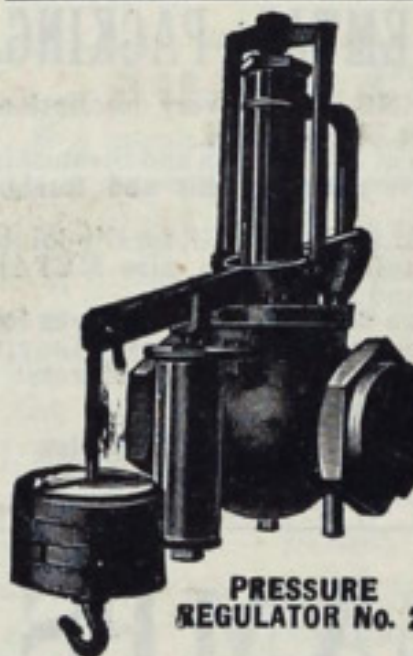
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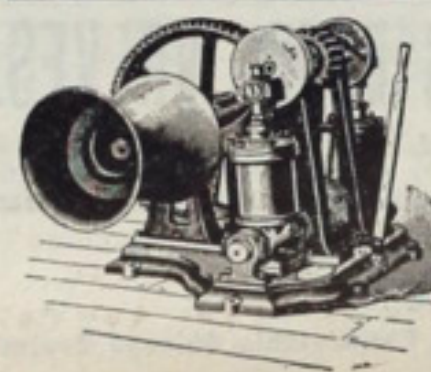
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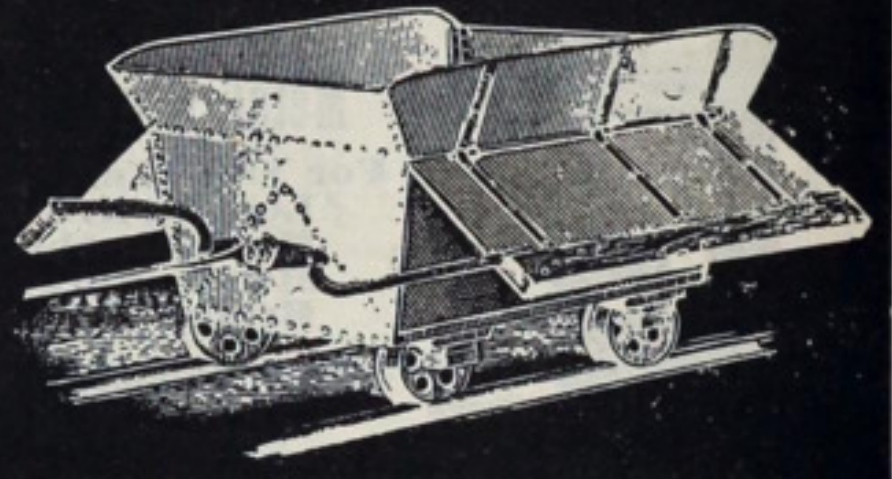
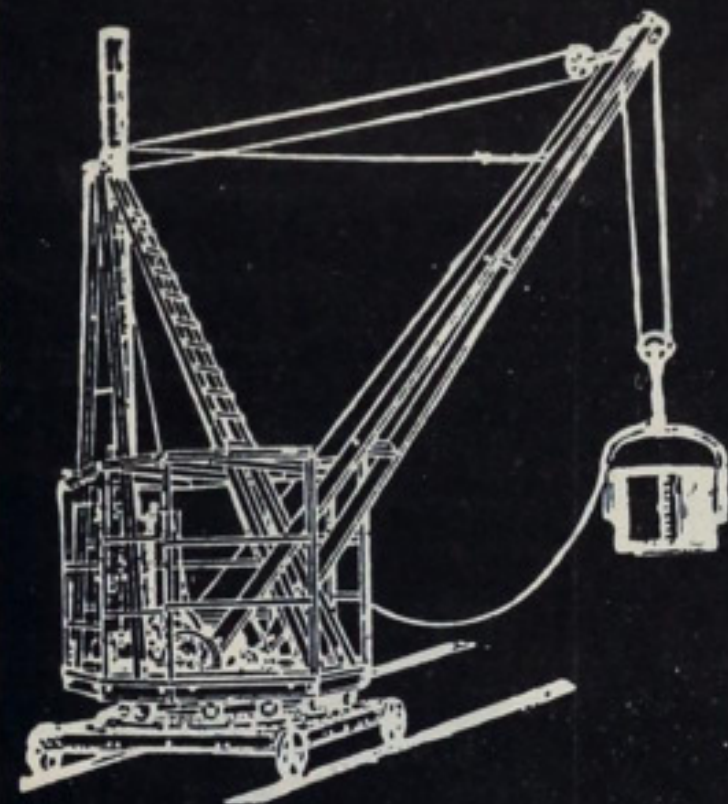
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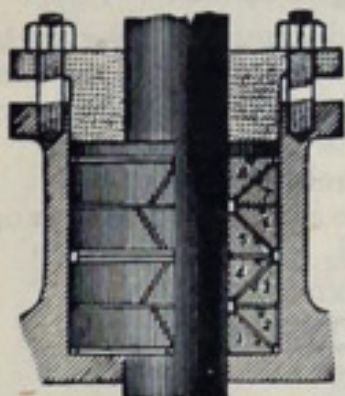
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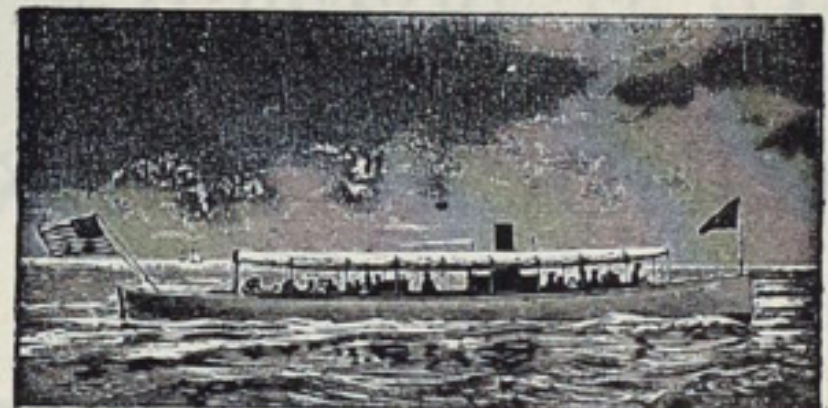
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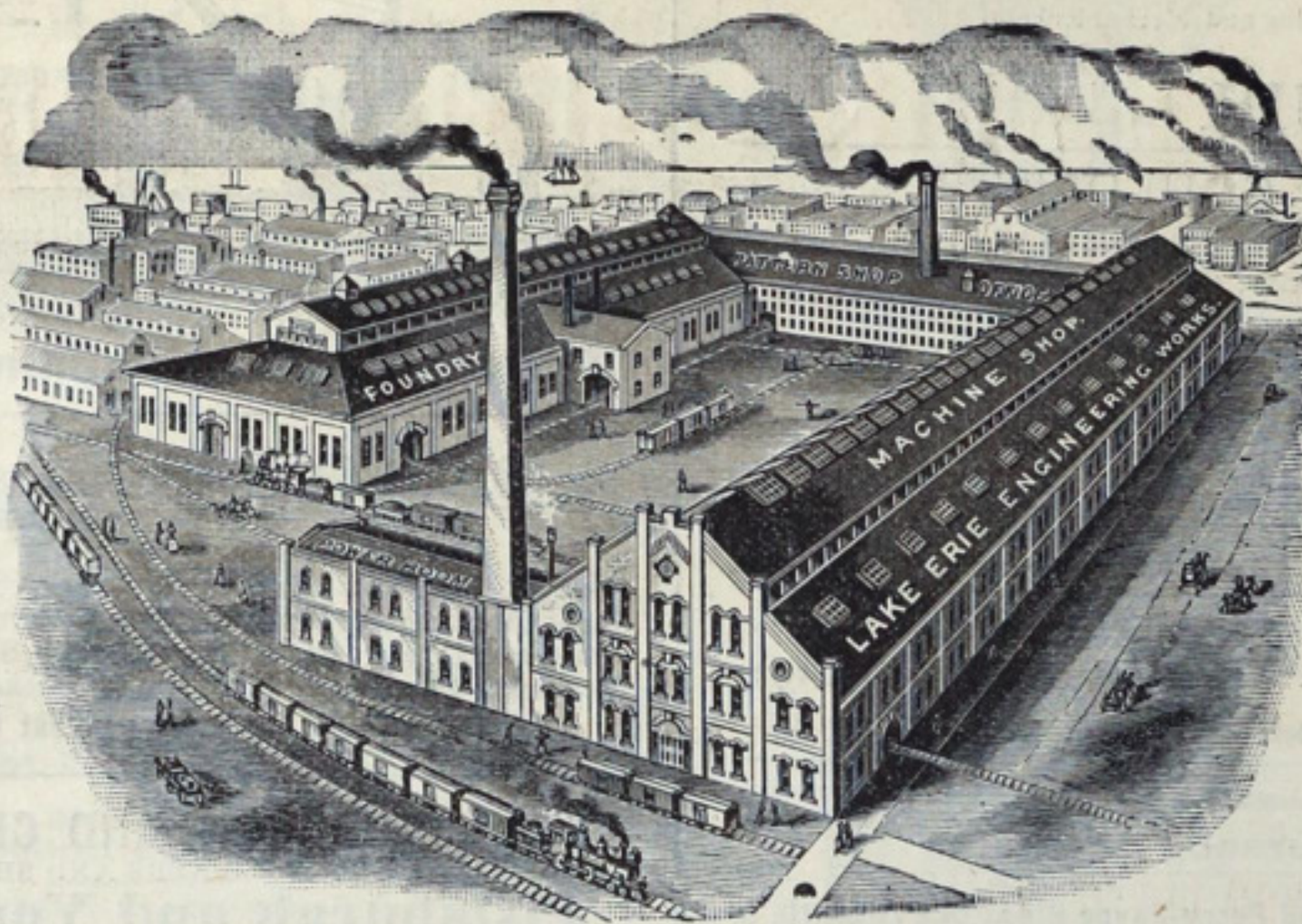
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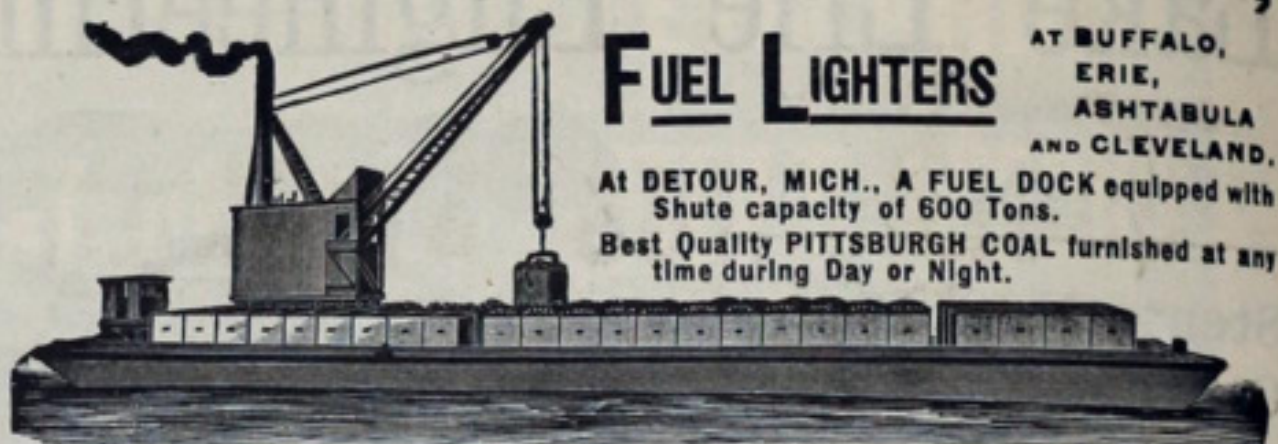
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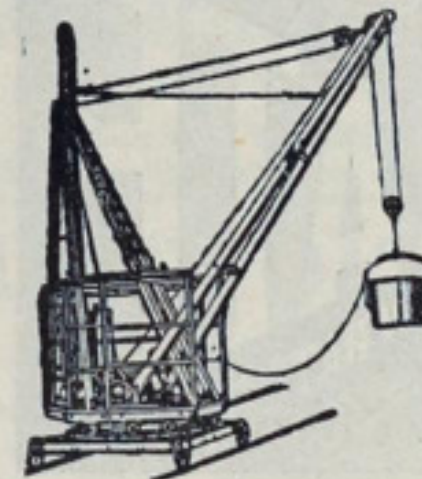
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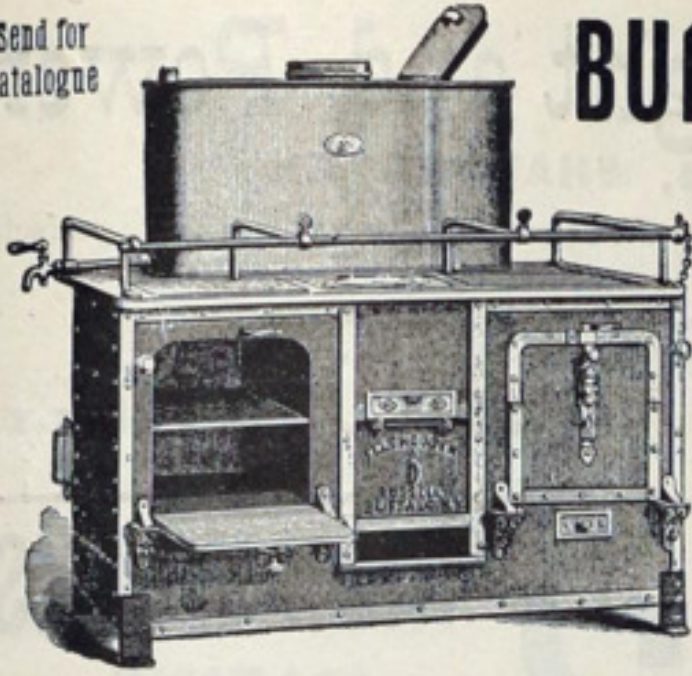
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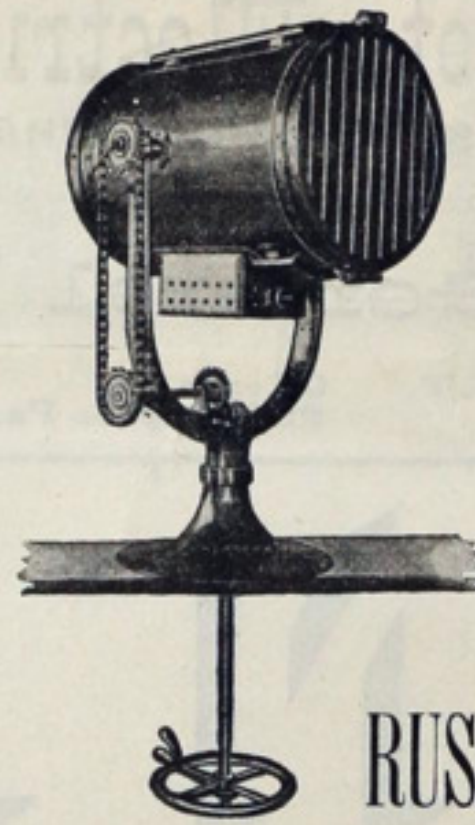
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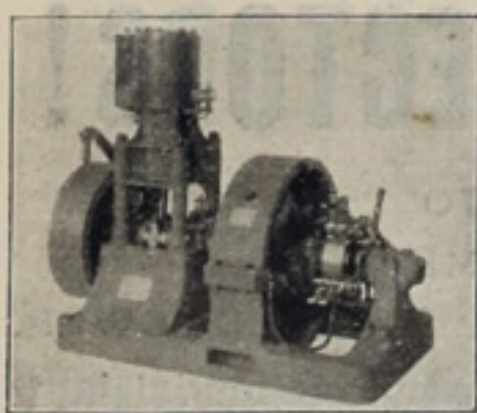
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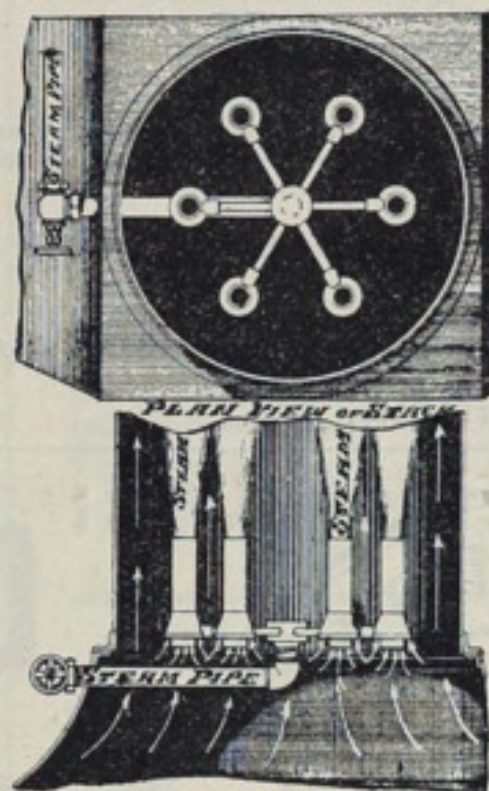
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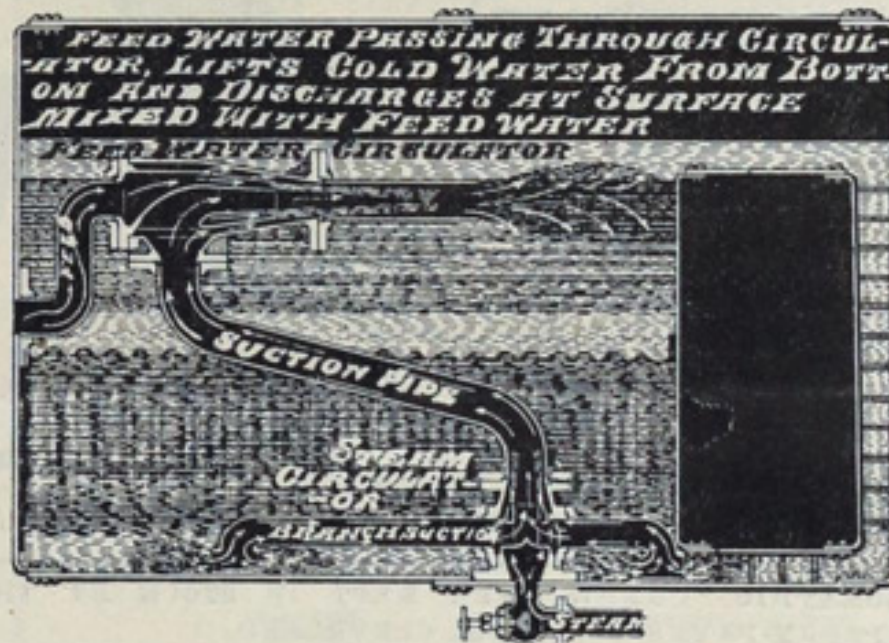
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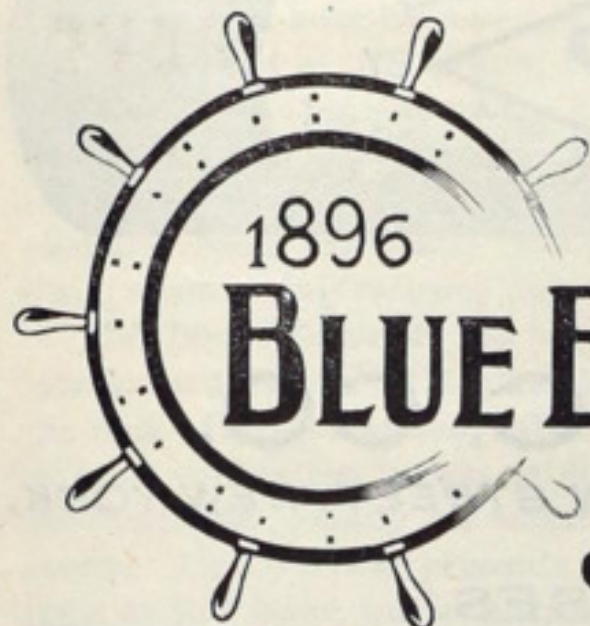
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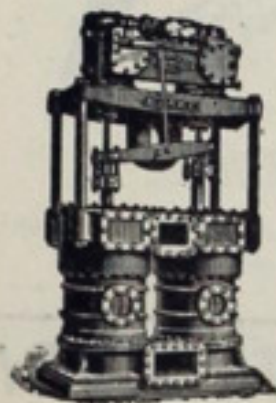
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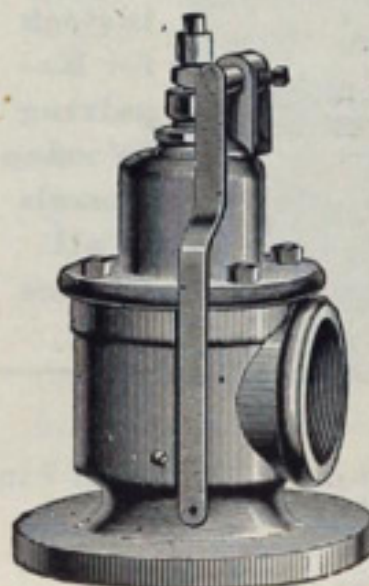
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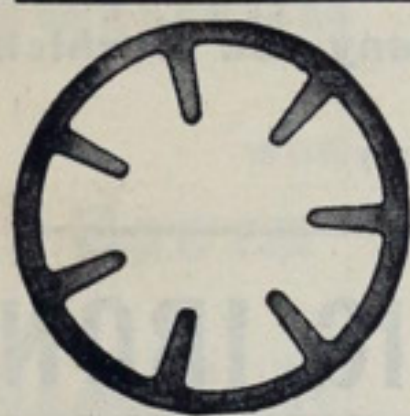
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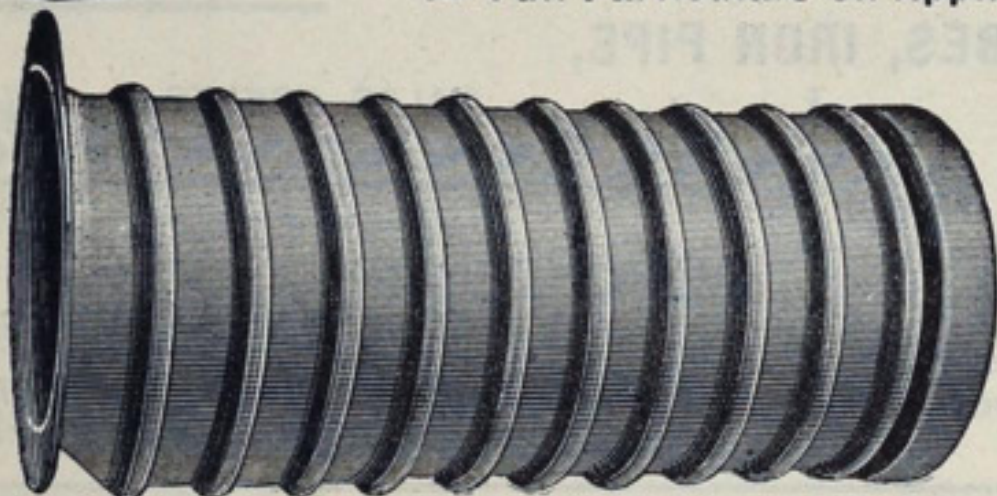
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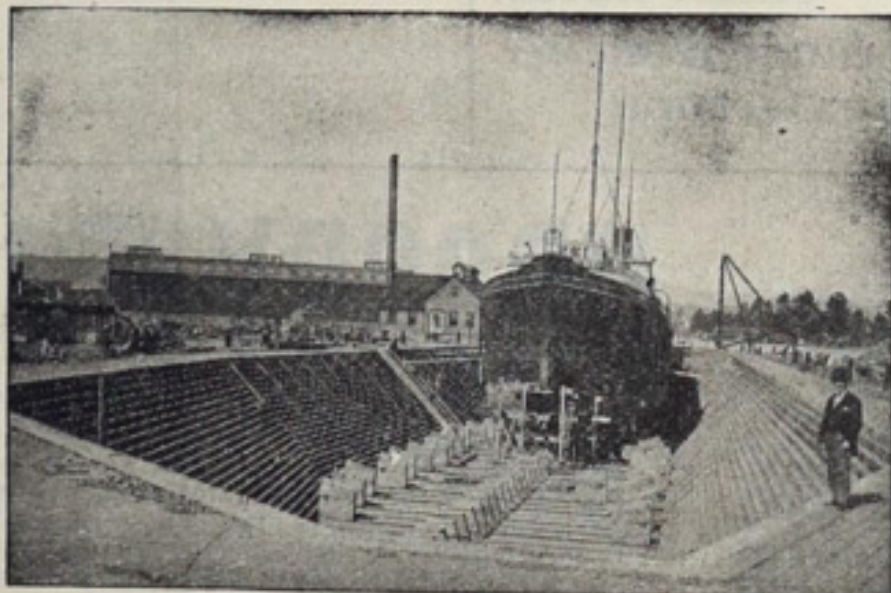
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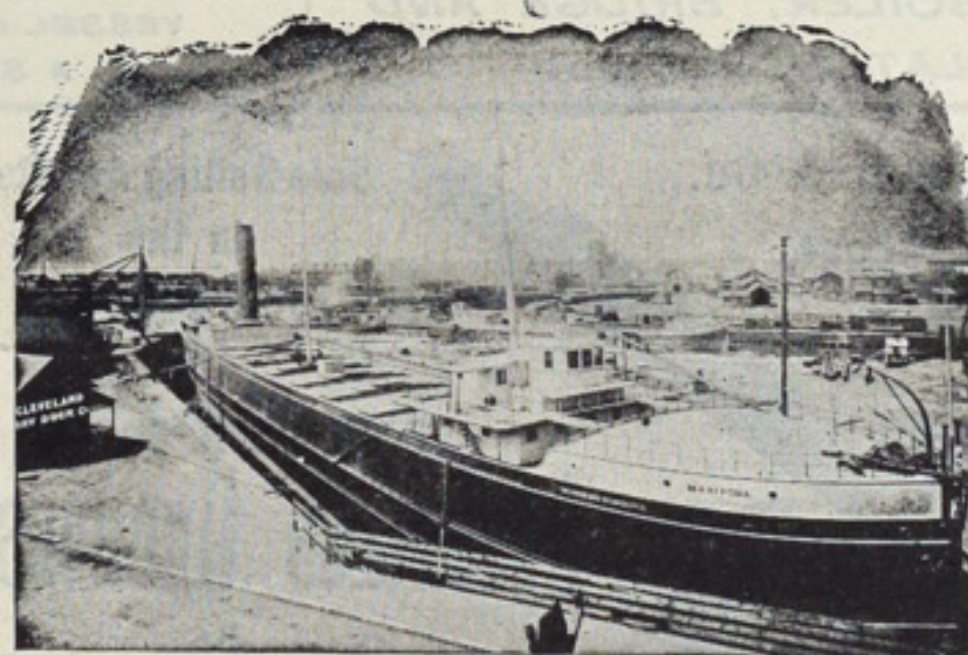
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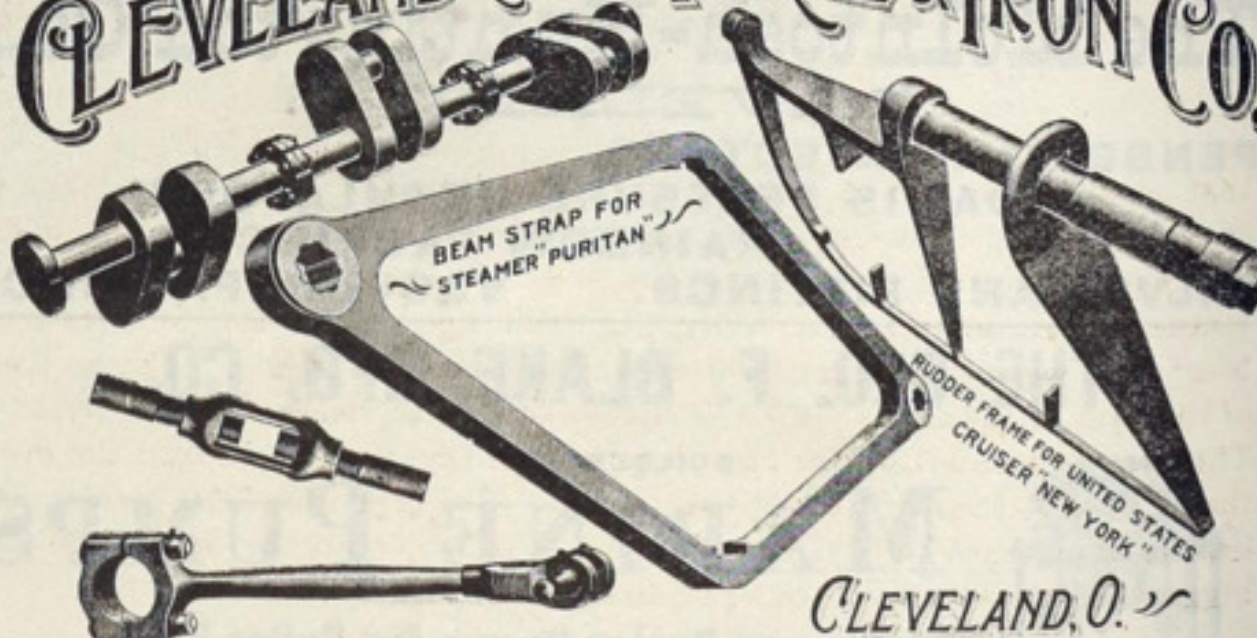
Dimensions of Dock:

Lth. over all, 360 ft.
Lth. on blocks, 340 ft.
Width of gate, 50 ft.
Depth over sill, 20 ft.

Capt. W. W. BROWN
Sec'y & Mgr.



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IRON OR STEEL FORGINGS FINISHED COMPLETE, ROUGH MACHINED OR SMOOTH FORGED ONLY, OF ANY WEIGHT. COUPLING LINKS AND PINS. PRESSED WROUGHT IRON TURNBUCKLES. CAR IRON SPECIALTIES.



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